438

The PHOTOFACT Servicer

SET 438 ★ *Published for all users of Howard W. Sams' Photofact Folders* ★ APR 1, 1959

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This Servicer provides you with essential data on other models or special equipment not covered in standard PHOTOFACT folders. The schematics and supplementary data included here will be of valuable help to you in servicing this equipment.

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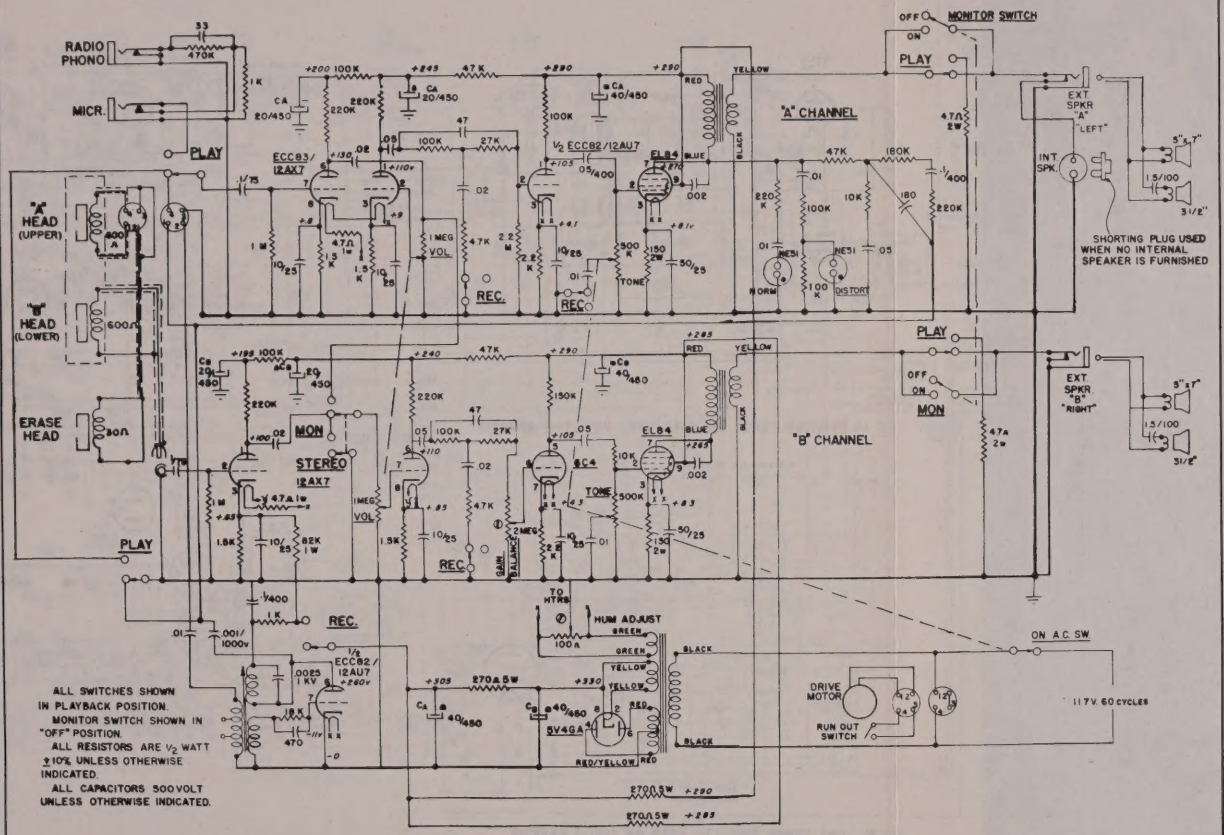
ADMIRAL
452, 453
454 (Ch. 5S4)

CBS-COLUMBIA
Chassis 1121-1

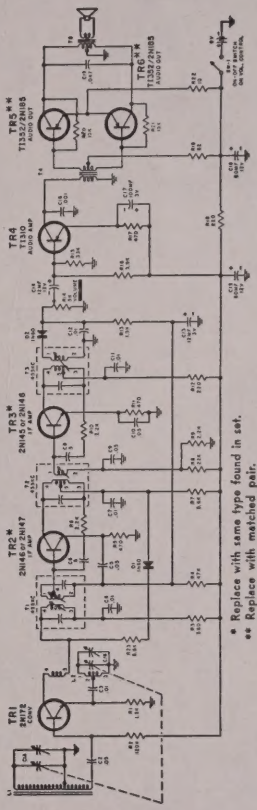
SYMPHONIC
Chassis S-300

TRAV-LER
TR260, TR261, TR262



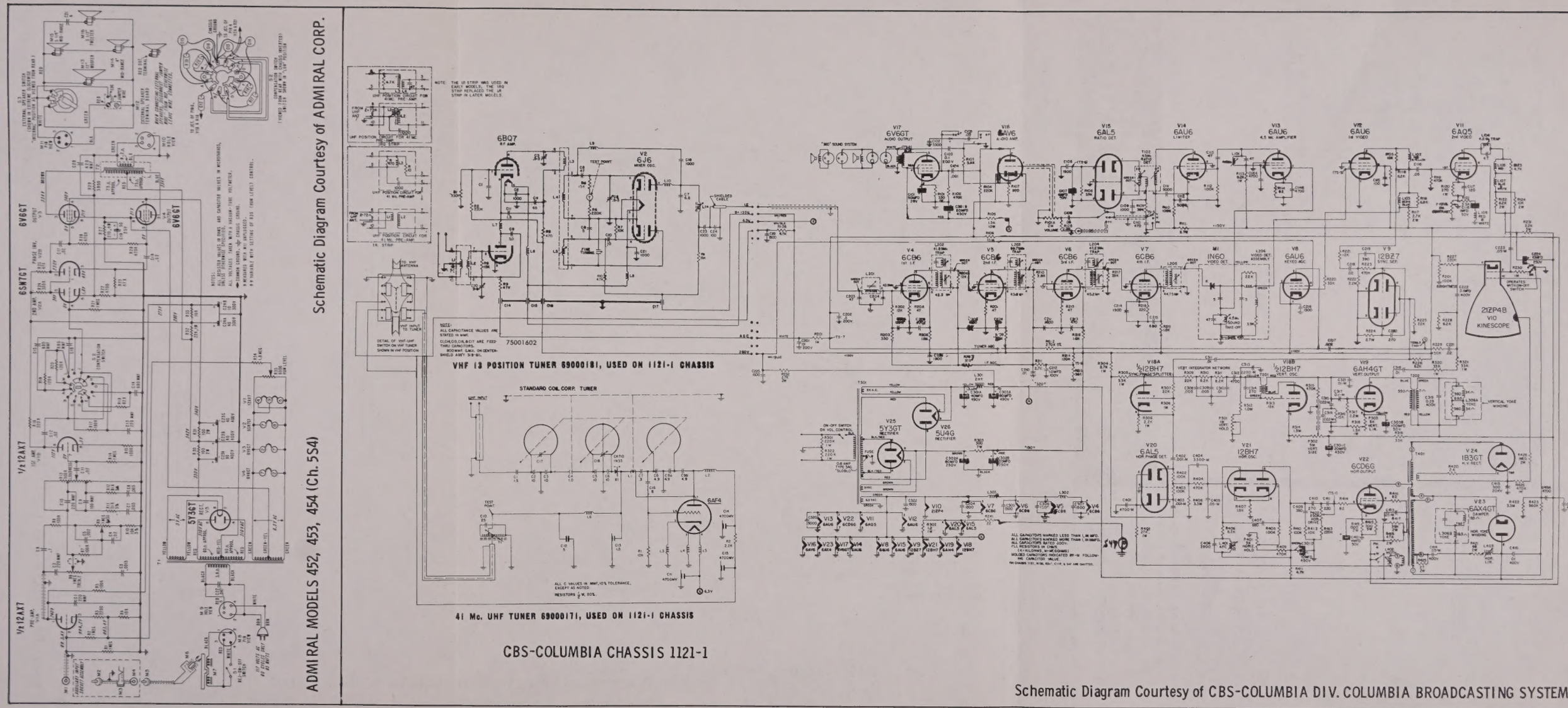
SYMPHONIC CHASSIS S-300

Schematic Diagram Courtesy of SYMPHONIC RADIO & ELECTRONIC CORP.



TRAV-LER MODELS TR260, TR261, TR262

Schematic Diagram Courtesy of TRAV-LER CORP.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Schematic Diagram Courtesy of ADMIRAL CORP.
6BQ7
6J6
6V6GT
6SN7GT
6AV6
6AL5
6AU6
6AQ5
6CB6
IN60
12BZ7
21ZP4B
VIO
KINESCOPE
5Y3GT
5U4G
12BH7
6AH4GT
6CD6G
1B3GT
6AX4GT
6AF4
5T36T
VHF 13 POSITION TUNER 69000181, USED ON 1121-1 CHASSIS
41 Mc. UHF TUNER 69000171, USED ON 1121-1 CHASSIS
CBS-COLUMBIA CHASSIS 1121-1
Schematic Diagram Courtesy of CBS-COLUMBIA DIV. COLUMBIA BROADCASTING SYSTEM

PHOTOFACT* Folder with CIRCUITRACE*

ELECTRONIC INDUSTRIES ASSOCIATION MEMBER EIA

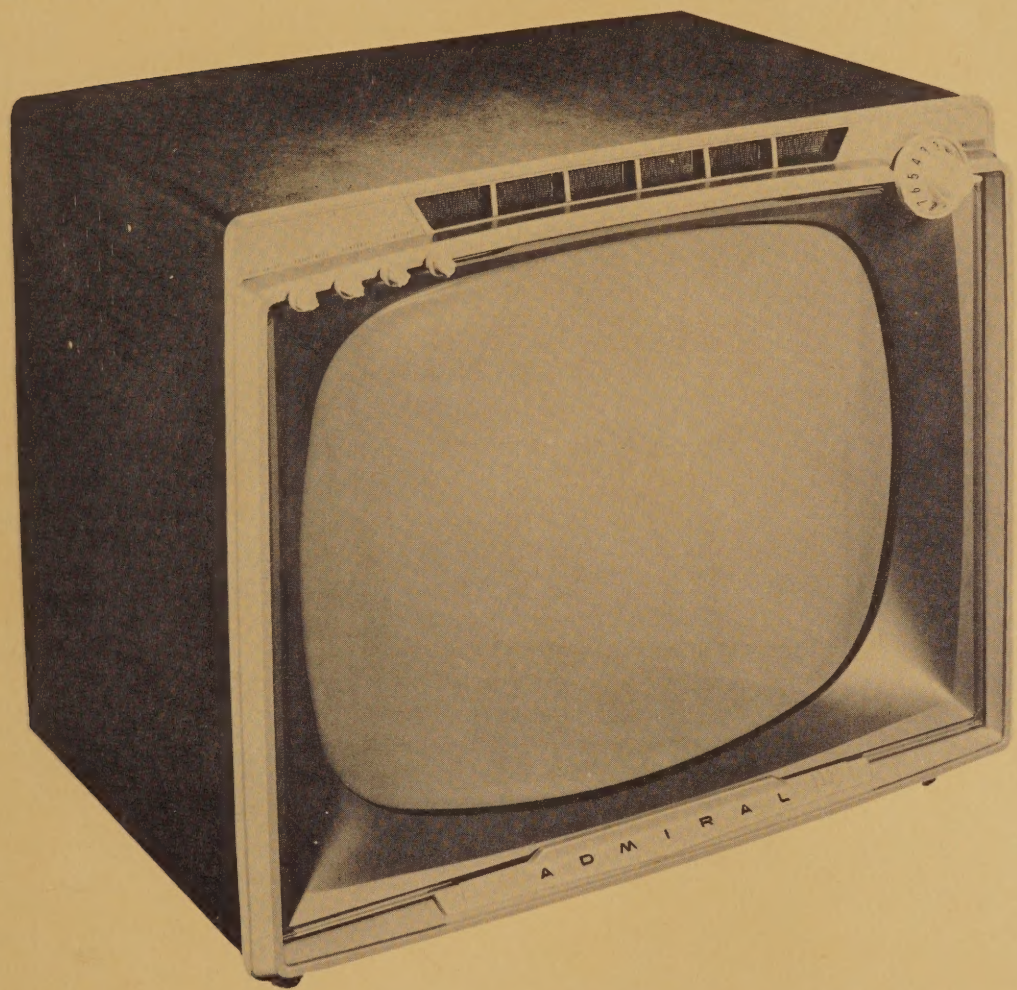
ADMIRAL MODELS C21E11E, 12E, 13E, CA21E11E, 12E, 13E, T21E21E, 22E, 23E, TA21E21E, 22E, 23E (Ch. 16AR1C, 16AS1C, 16R1C, CB, 16S1C, CB)

IMPORTANT FILING NOTICE

The TV Folder for this envelope will be found among the first folders in this complete Set of folders.

Merely insert the corresponding folder on this model in this envelope to retain proper filing and indexing order.

ADMIRAL MODELS C21E11E, 12E, 13E, CA21E11E, 12E, 13E, T21E21E, 22E, 23E, TA21E21E, 22E, 23E (Ch. 16AR1C, 16AS1C, 16R1C, CB, 16S1C, CB)



MODEL TA21E21E (Ch. 16AR1C)

ADMIRAL MODELS C21E11E, 12E, 13E, CA21E11E, 12E, 13E, T21E21E, 22E, 23E, TA21E21E, 22E, 23E (Ch. 16AR1C, 16AS1C, 16R1C, CB, 16S1C, CB)

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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PHOTOFACT* Folder with CIRCUITRACE*

EIA MEMBER

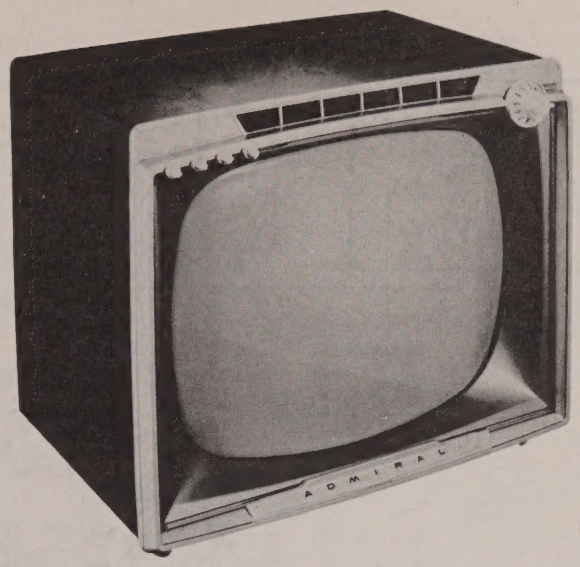
ADMIRAL MODELS C21E11E, 12E, 13E, CA21E11E, 12E, 13E, T21E21E, 22E, 23E, TA21E21E, 22E, 23E (Ch. 16AR1C, 16AS1C, 16R1C, CB, 16S1C, CB)

ADMIRAL MODELS C21E11E, 12E, 13E, CA21E11E, 12E, 13E, T21E21E, 22E, 23E, TA21E21E, 22E, 23E (Ch. 16AR1C, 16AS1C, 16R1C, CB, 16S1C, CB)

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove snap on rear cover.
2. Remove speaker leads.
3. Remove 4 metal screws holding side chassis.
4. Remove 1 bottom chassis bolt and 2 metal screws holding bottom chassis bracket.
5. Remove chassis from the front of cabinet.



MODEL TA21E21E (Ch. 16AR1C)

TRADE NAME	Admiral	MODELS	CHASSIS
		TA21E21E, TA21E22E, TA21E23E	16AR1C
		CA21E11E, CA21E12E, CA21E13E	16AS1C
		T21E21E, T21E22E, T21E23E	16R1C
			16R1CB
		C21E11E, C21E12E, C21E13E	16S1C
			16S1CB
MANUFACTURER	Admiral Corp., 3800 W. Cortland St., Chicago 47, Illinois		
TYPE SET	Television Receiver		
TUBES	VHF - Sixteen, UHF - Seventeen		
POWER SUPPLY	110-120 Volts AC, 60 Cycle	RATING 155 Watts, 1.46 Amp. @ 117 Volts AC	
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)		

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustment of the VHF Oscillator is possible by removing the Channel Selector and Fine Tuning knobs. Set the Fine Tuning at the center of its range. The adjustments are accessible, one at a time, as the Channel Selector is rotated. Adjust for best picture and sound. NOTE: Adjust in sequence from the lowest to the highest channel. If two slugs are visible adjust lower slug.

SAFETY GLASS REMOVAL

Remove name plate at bottom center of safety glass by pulling away from cabinet. Remove 2 metal screws holding the safety glass retainer strip. Pull bottom of safety glass outward and slide down to remove.

AGC

No provision is made to vary the AGC on this receiver.

FOCUS

The focus may be varied in steps by the position of a plug in the Focus Adjustment board.

SUPER RANGE FINDER ADJUSTMENT

The Super Range Finder (used in some versions) is adjusted to improve reception in fringe areas and areas where interference is present.
The Super Range Finder control should be turned fully counterclockwise and left there if satisfactory pictures can be obtained in this position. Where the signal strength is weak, turn the control clockwise until the picture is satisfactory. White flashes and snow can sometimes be minimized by carefully adjusting the Super Range Finder.
Keep this control set as far counterclockwise as far as possible consistent with satisfactory pictures to prevent overloading or excessive contrast.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENTS

The Horizontal Frequency coil is used as the Horizontal Lock control. Adjust the Horizontal Lock until the picture synchronizes horizontally. (For location, see tube placement chart.)

FUSE

One fuse is used for low voltage supply protection. (For location, see tube placement chart.)

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube. Rotate the two rings around the neck of the tube until the picture is properly centered.

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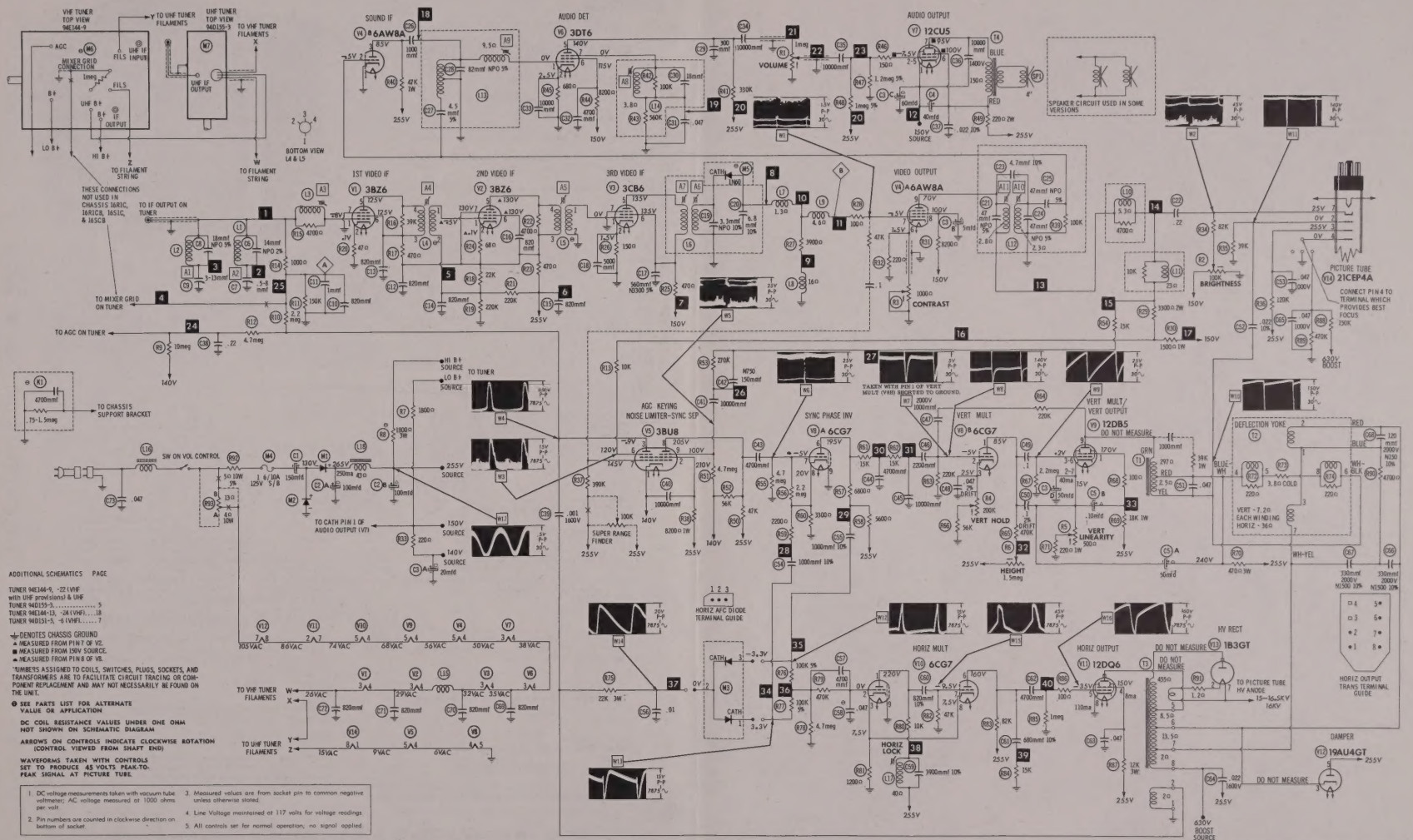
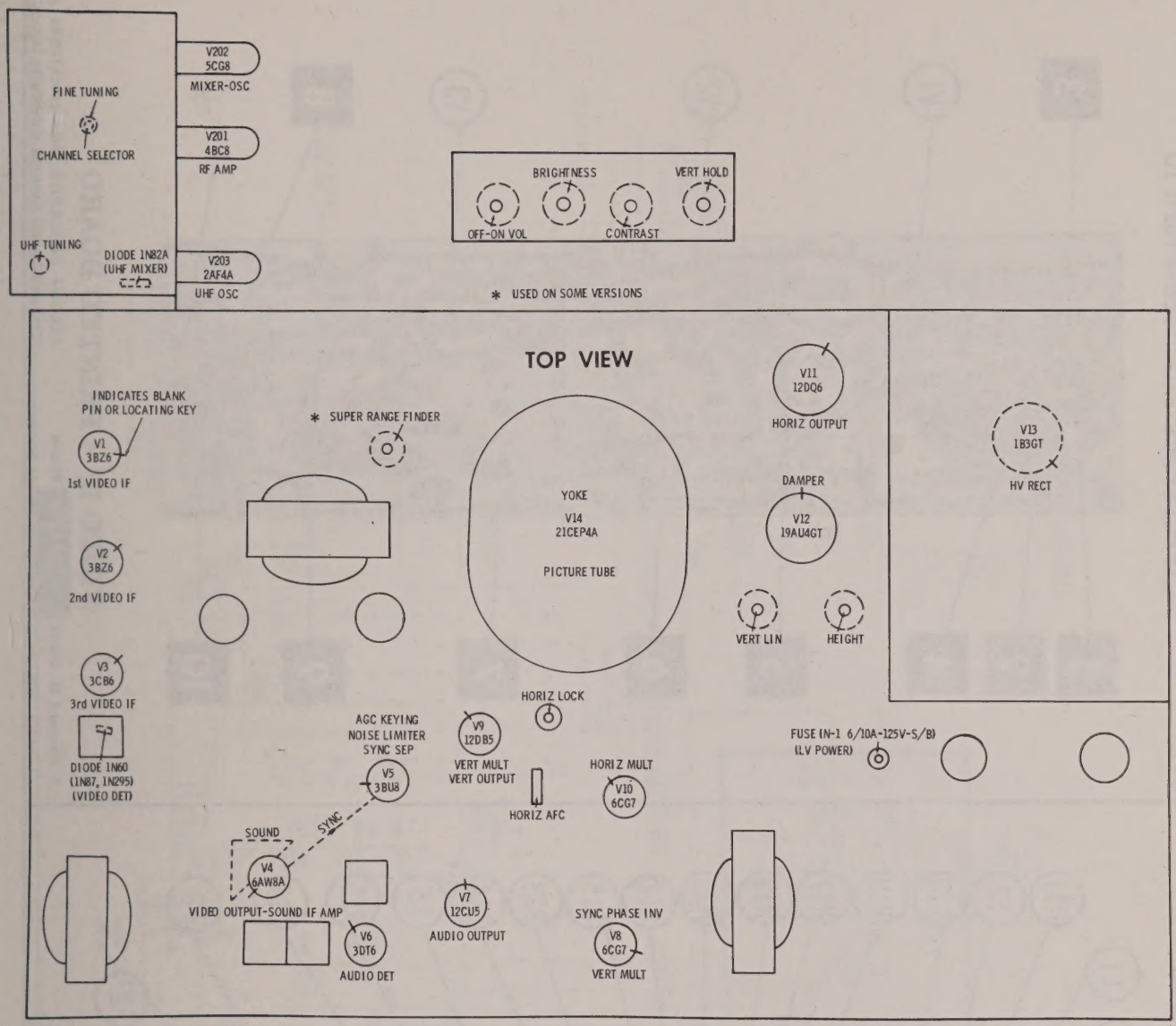

VHF TUNER TOP VIEW 94E144-9
UHF TUNER TOP VIEW 94D155-3
TO VHF TUNER FILAMENTS
TO UHF TUNER FILAMENTS
AGC
MIXER GRID CONNECTION
UHF IF INPUT
UHF IF OUTPUT
FILS
B+
LO B+
HI B+
TO FILAMENT STRING
BOTTOM VIEW L4 & L5
THESE CONNECTIONS NOT USED IN CHASSIS 16R1C, 16R1CB, 16S1C, & 16S1CB
TO IF OUTPUT ON TUNER
TO MIXER GRID ON TUNER
TO AGC ON TUNER
TO CHASSIS SUPPORT BRACKET
SOUND IF
AUDIO DET
AUDIO OUTPUT
6AW8A
3DT6
12CU5
VOLUME
SPEAKER CIRCUIT USED IN SOME VERSIONS
1ST VIDEO IF
2ND VIDEO IF
3RD VIDEO IF
3BZ6
3CB6
VIDEO OUTPUT
6AW8A
BRIGHTNESS
CONTRAST
PICTURE TUBE 21CEP4A
CONNECT PIN 4 TO TERMINAL WHICH PROVIDES BEST FOCUS
630V BOOST
SW ON VOL CONTROL
TO TUNER
HI B+ SOURCE
LO B+ SOURCE
255V SOURCE
150V SOURCE
140V SOURCE
TO CATH PIN 1 OF AUDIO OUTPUT V7
AGC KEYING NOISE LIMITER-SYNC SEP
3BU8
SYNC PHASE INV
6CG7
VERT MULT
VERT MULT/ VERT OUTPUT
12DB5
DO NOT MEASURE
VERT HOLD
VERT LINEARITY
HEIGHT
DEFLECTION YOKE
VERT - 7.2Ω EACH WINDING HORIZ - 36Ω
SUPER RANGE FINDER
HORIZ AFC DIODE TERMINAL GUIDE
HORIZ MULT
6CG7
HORIZ OUTPUT
12DQ6
HV RECT
1B3GT
TO PICTURE TUBE HV ANODE
15-16.5KV 16KV
HORIZ OUTPUT TRANS TERMINAL GUIDE
DAMPER
19AU4GT
TO VHF TUNER FILAMENTS
TO UHF TUNER FILAMENTS
105VAC
86VAC
74VAC
68VAC
56VAC
50VAC
38VAC
26VAC
29VAC
32VAC
35VAC
15VAC
9VAC
6VAC
ADDITIONAL SCHEMATICS PAGE
TUNER 94E144-9, -22 (-VHF with UHF provisions) & UHF
TUNER 94D155-3 5
TUNER 94E144-13, -28 (-VHF) 18
TUNER 94D151-5, -6 (-VHF) 7
DENOTES CHASSIS GROUND
▲ MEASURED FROM PIN 7 OF V2.
■ MEASURED FROM 150V SOURCE.
▲ MEASURED FROM PIN 8 OF V8.
*UNLESS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.
SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION
DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM.
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)
WAVEFORMS TAKEN WITH CONTROLS SET TO PRODUCE 45 VOLTS PEAK-TO-PEAK SIGNAL AT PICTURE TUBE.
1. DC voltage measurements taken with vacuum tube voltmeter; AC voltage measured at 1000 ohms per volt.
2. Pin numbers are counted in clockwise direction on bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line Voltage maintained at 117 volts for voltage readings.
5. All controls set for normal operation; no signal applied.
A PHOTOFACT STANDARD NOTATION SCHEMATIC
CIRCUITRACE
©Howard W. Sams & Co., Inc 1959
ADMIRAL MODELS C21E11E, 12E, 13E, CA12E11E, 12E, 13E, T21E21E, 22E, 23E, TA21E21E, 22E, 23E (Ch. 16AR1C, 16AS1C, 16R1C, CB, 16S1C, CB)

TUBE PLACEMENT CHART



ADMIRAL MODELS C21E11E, 12E, 13E, CA21E11E, 12E, 13E, T21E21E, 22E, 23E, TA21E21E, 22E, 23E (Ch. 16AR1C, 16AS1C, 16R1C, CB, 16S1C, CB)

TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce indicated symptoms. Refer to tube placement chart for location and type of tube.

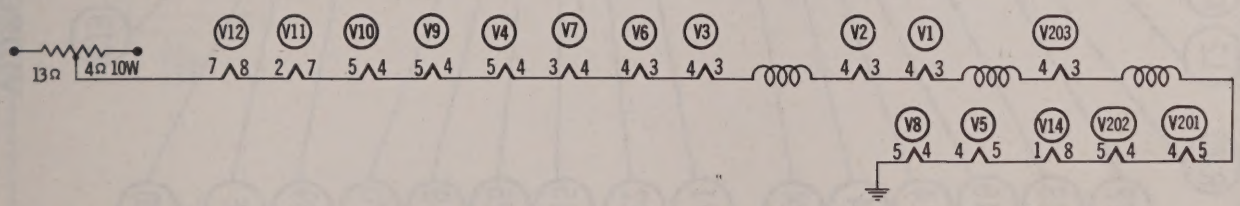
POWER SUPPLY FAILURE
No raster, no sound Fuse (1 6/10A), Rectifiers (B+)

SWEEP FAILURE
No raster, has sound Rectifier (AFC), V10, V11, V12, V13, V14, Rectifier (B+)
No vertical deflection V8, V9
Poor vert. linearity or foldover V8, V9
Poor horiz. linearity or foldover V10, V11, V12
Narrow picture V10, V11, V12, Rectifiers (B+)
Vert. off freq. V8, V9
Horiz. off freq. V10

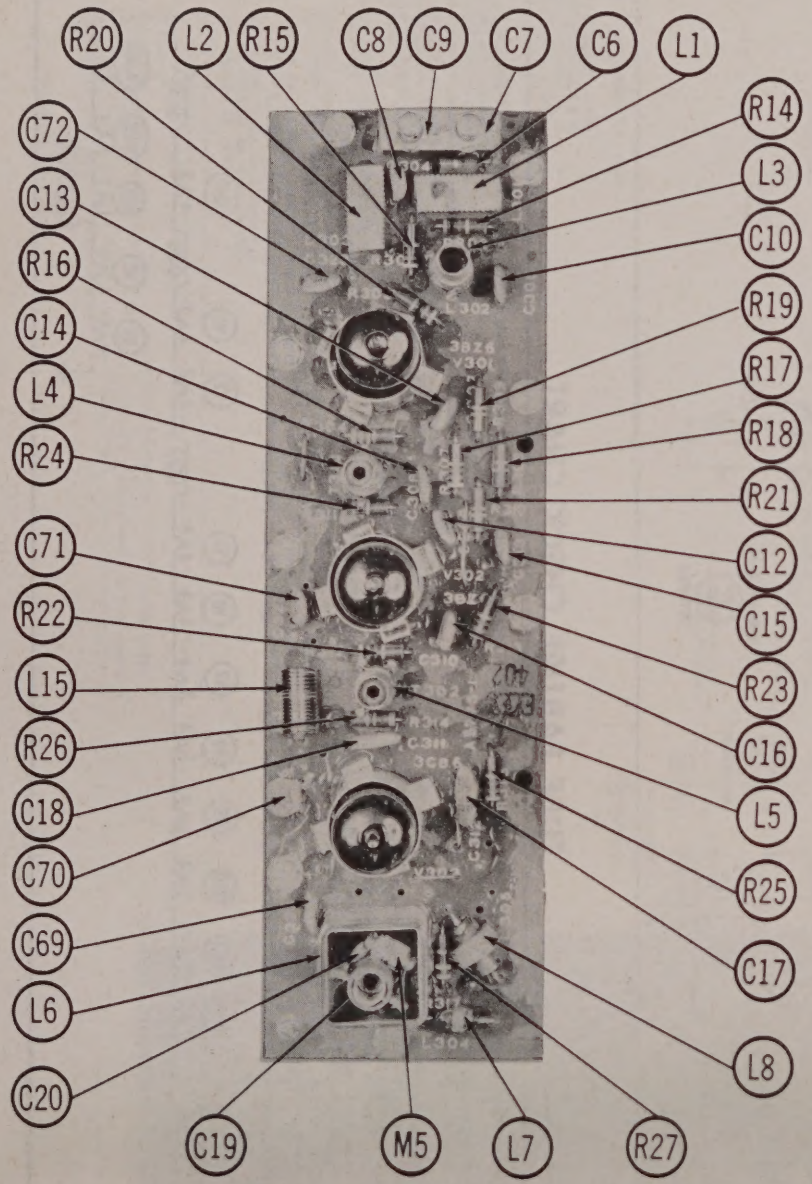
LOSS OF PICTURE OR SOUND
No pic, no sound, has raster V1, V2, V3, Diode (Video Det), V4
No pic, no sound, has snow V201, V202, V1, (V203, UHF only)
No pic, has sound, has raster V4, V14
Has pic, no sound V4, V6, V7
Overloaded picture V5

SYNC FAILURE
No vert. sync V5, V8
No horiz. sync V5, V8, Rectifier (AFC)
No vert. or horiz. sync V5, V8

This receiver employs tubes used in a series filament network, an open filament in any tube will cause the set to be inoperative. (See circuit below.)

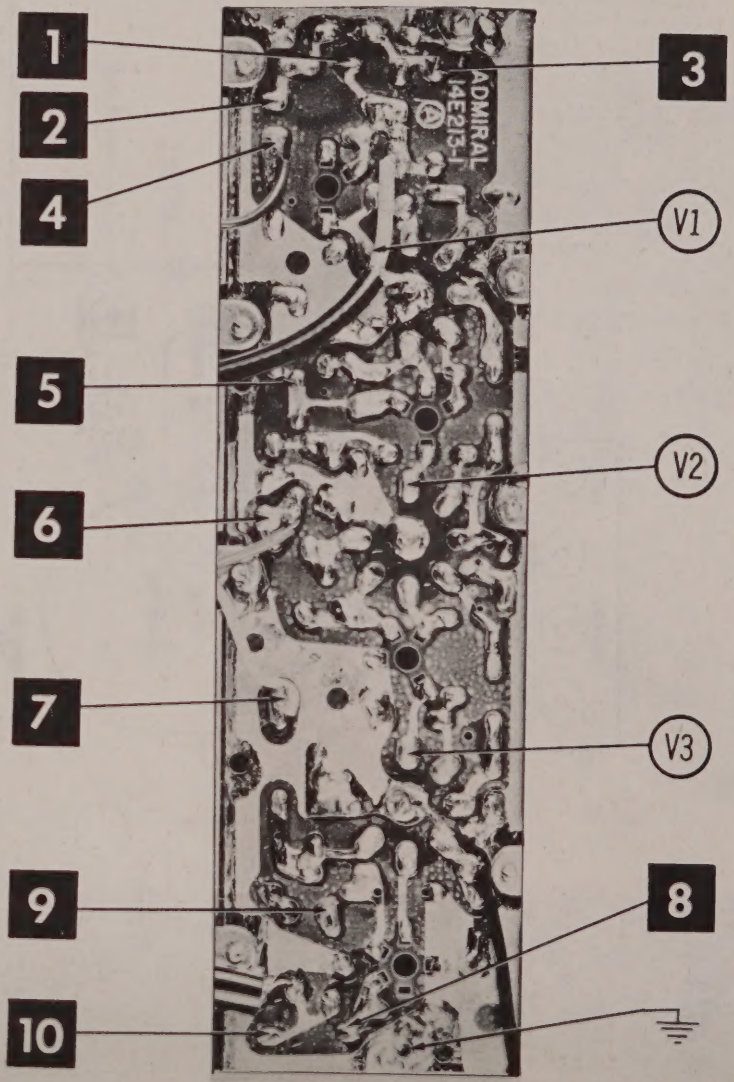


FOLDER 1



VIDEO IF - PRINTED BOARD

CircuiTrace Numbers 1 thru 10



VIDEO IF - PRINTED BOARD

A Howard W. Sams CIRCUITRACE® Photo

ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED

ADMIRAL MODELS C21E11E, 12E, 13E, CA12E11E, 12E, 13E, T21E21E, 22E, 23E, TA21E21E, 22E, 23E (Ch. 16AR1C, 16AS1C, 16R1C, CB, 16S1C, CB)

VHF TUNER with UHF provisions 94E144-9, -22, - UHF TUNER 94D155-3

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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RF AMP 4BC8
MIXER A 5CG8
OSC B 5CG8
4BC8 5CG8
UHF OSC 2AF4A
CRYSTAL MIXER 1N82A
TEST POINT
FINE TUNING
GIMMICK
TO JUNCTION OF R39, R16, C22 & C10
IF OUTPUT
MIXER PLATE COIL
CONVERTER B+
RF AGC
TO FILAMENT STRING
UHF B+ JUMPER
NUMBERS & LETTERS HAVE BEEN ASSIGNED SELECTOR WHEELS FOR CIRCUIT TRACING
MIXER-OSC. SELECTOR WHEEL (VIEWED FROM REAR)
RF SELECTOR WHEEL (VIEWED FROM FRONT)
MIXER-OSC. SELECTOR WHEEL (VIEWED FROM FRONT)
RF SELECTOR WHEEL (VIEWED FROM REAR)
VHF ANT. TERMINAL BOARD
UHF ANT. TERMINAL BOARD
◆ MEASURED IN UHF POSITION
* MEASURED FROM PIN 3 OF V201

TUNER PARTS LIST AND DESCRIPTIONS

94E144-9

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V201	RF Amp.	4BC8	
V202	Mixer-Osc.	5CG8	

ITEM No.	USE	TYPE	NOTES
V203	UHF Osc.	2AF4A	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	ADMIRAL PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C201	120		65D10-136						N1500 10%
C202	22		65D10-134	N750-D122	DTN-22	C10Q22U	CN7-422	5TCU-Q22S 10%*	N750 10%
C203	15		65D10-135	N750-D15	DTN-15	C10Q15U	CN7-415	5TCU-Q15S 10%*	N750 10%
C204	8.2		65D10-131	NPO-D18.2		C10V82C		5TCCB-V82S 5%*	NPO 5%
C205	1000		65B26-5	EF-001	MFT-1000			503C-D1	
C206	3		65B28-030	NPO-S13	D6-030	C10V3C		5TCCB-V3S *	
C207	1000		65B26-5	EF-001	MFT-1000			503C-D1	
C208	1000		65B26-5	EF-001	MFT-1000			503C-D1	
C209	.5-3		66A38-6		829-3				
C210	2.2		65D10-27						N1500 10%
C211	1000		65B26-5	EF-001	MFT-1000			503C-D1	
C212	1000		65D10-53	BPD-001	DD-102	BYA10D1M	B-210	5HK-D1	
C213	47		65D10-73						N1400 5%
C214	.5-3		66A38-6		829-3				
C215	10		65D10-160						N2200 5%
C216	1		65B28-010	NPO-S11			CNO-510	5TCCB-V1S 10%*	10%
C217	800		65D10-20	BPD-0008	DD-801	L10T8		5GA-T8	
C218	27		65D10-93		TCZ-27	C10Q27C	CNO-427	5TCC-Q27S 10%*	NPO 10%
C219	1.5		65B28-015	NPO-S11.5	TCZ-1R5	CTA6V15C	CNO-515	5TCCB-V15S 10%*	
C220	1.5		65B28-015	NPO-S11.5	TCZ-1R5	CTA6V15C	CNO-515	5TCCB-V15S 10%*	
C221	1000		65D10-53	BPD-001	DD-102		B-210	5HK-D1	
C222	1000		65B26-5	EF-001	MFT-1000			503C-D1	
C223	1000		65B26-5	EF-001	MFT-1000			503C-D1	
C224	33		94D112-52						
C225			94D112-61						
C226	1000		94D112-51	EF-001	MFT-1000			503C-D1	
C227	1000		94D112-51	EF-001	MFT-1000			503C-D1	
C228	1000		94D112-51	EF-001	MFT-1000			503C-D1	
C229	1000		94D112-51	EF-001	MFT-1000			503C-D1	

* Not normally in distributors stock. Available thru distributor on order to manufacturer.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		ADMIRAL PART No.	NOTES
	OHMS	WATT		
R201	3900Ω		60B8-392	
R202	560K		60B8-564	
R203	820K		60B8-824	
R204	33Ω		60B8-330	
R205	1meg		60B8-105	
R206	10K		60B8-103	
R207	1000Ω		60B8-102	

ITEM No.	RATING		ADMIRAL PART No.	NOTES
	OHMS	WATT		
R208	22K		60B8-223	
R209	10K		60B8-103	
R210	27Ω		60B8-270	Note 1
R211	8200Ω	3	61B24-347	
R212	8200Ω		60B8-822	
R213	1500Ω		60B8-152	
R214	680K		60B8-684	

Note 1. Some versions may use 15Ω in this application (Part #60B8-150).

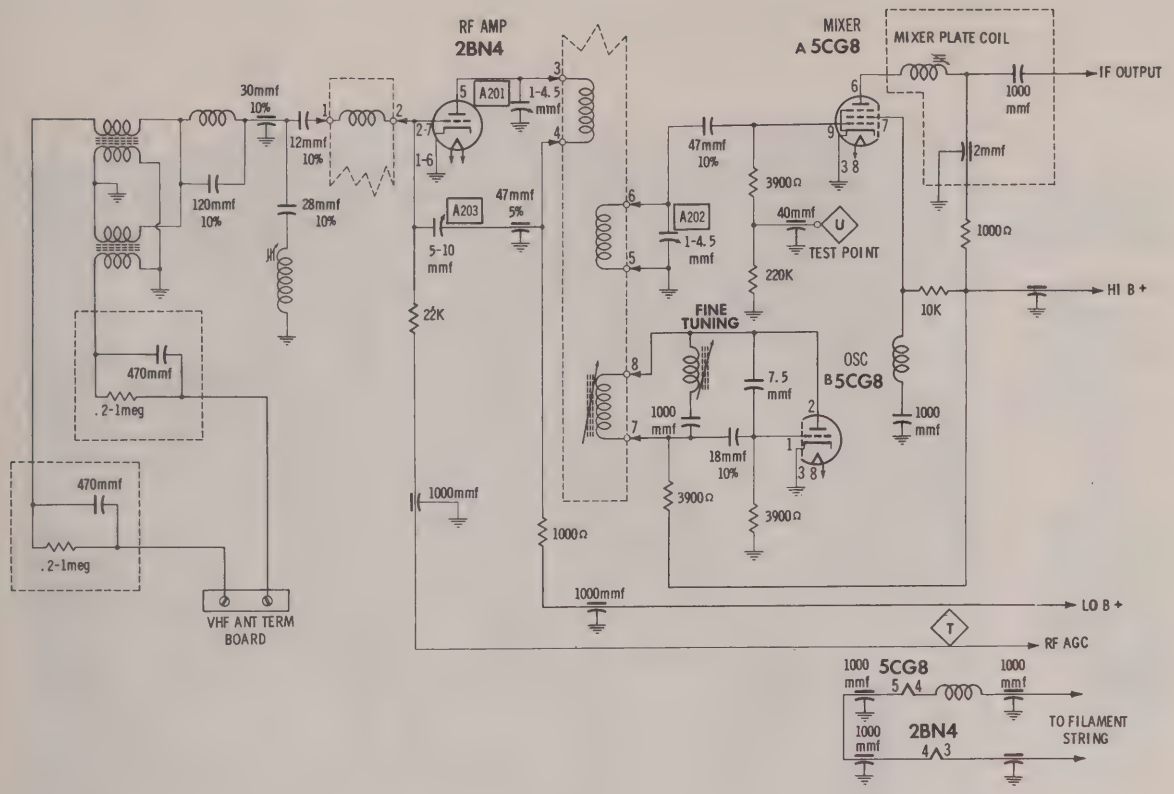
COILS (RF-IF)

ITEM No.	USE	ADMIRAL PART No.	NOTES
L201	Ant. Trans. Assy.	700B110-2	
L202	IF Trap Coil	73D30-43	
L203	Ant. Coil	73D30-12	Channels 2 - 5
L204	Ant. Coil	73D30-17	Channel 6
L205	Ant. Coil	73D30-18	Channels 7, 8, 9
L206	Ant. Coil	73D30-21	Channels 10 & 11
L207	Ant. Coil	73D30-40	Channels 12 & 13
L208	RF Choke	73A2-9	
L209	RF Coil	73D30-19	Channels 2 - 5
L210	RF Coil	73D30-27	Channel 6
L211	RF Coil	73D30-8	Channels 7, 8, 9
L212	RF Coil	73D30-5	Channels 10 & 11
L213	RF Coil	73D30-25	Channels 12 & 13
L214	Mixer Grid Coil	73D30-20	Channels 2 - 5
L215	Mixer Grid Coil	73D30-38	Channel 6
L216	Mixer Grid Coil	73D30-45	Channels 7, 8, 9

ITEM No.	USE	ADMIRAL PART No.	NOTES
L217	Mixer Grid Coil	73D30-1	Channels 10 & 11
L218	Mixer Grid Coil	73D30-31	Channels 12 & 13
L219	Osc. Coil	73D30-11	Channels 2 & 3
L220	Osc. Coil	73D30-37	Channel 4
L221	Osc. Coil	73D30-34	Channel 5
L222	Osc. Coil	73D30-36	Channel 6
L223	Osc. Coil	73D30-1	Channels 7, 8, 9
L224	Osc. Coil	73D30-33	Channels 10 & 11
L225	Osc. Coil	73D30-32	Channels 12 & 13
L226	RF Choke	73D30-29	
L227	Mixer Plate Coil	73D30-44	
L228	RF Choke	73D30-42	
L229	UHF Input Coil	73D30-41	
L230	UHF Ant. Coil	94D112-60	
L231	Fil. Choke	94D112-53	
L232	Cathode Choke	94D112-56	
L233	RF Choke	94D112-54	

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	ADMIRAL PART No.	REPLACEMENT DATA	
K201	Antenna Isolation	470mmf, .5-1meg	63A11-1	Centralab Sprague	RC-471 AC1-1
K202	Antenna Isolation	470mmf, .5-1meg	63A11-1	Centralab Sprague	RC-471 AC1-1



A PHOTOFACT STANDARD NOTATION SCHEMATIC

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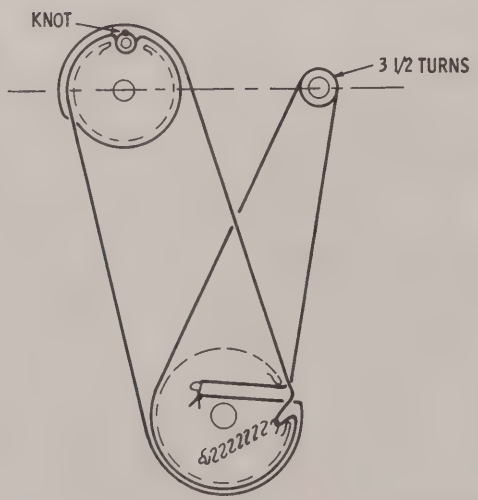
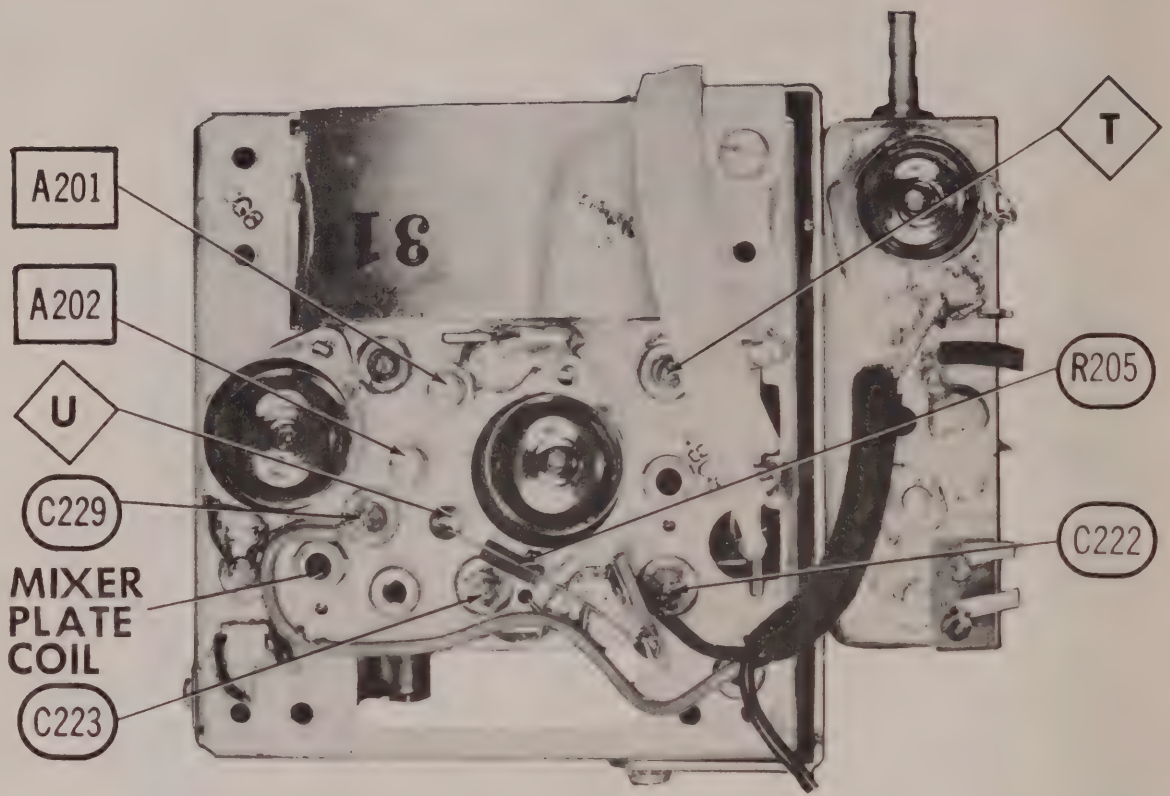
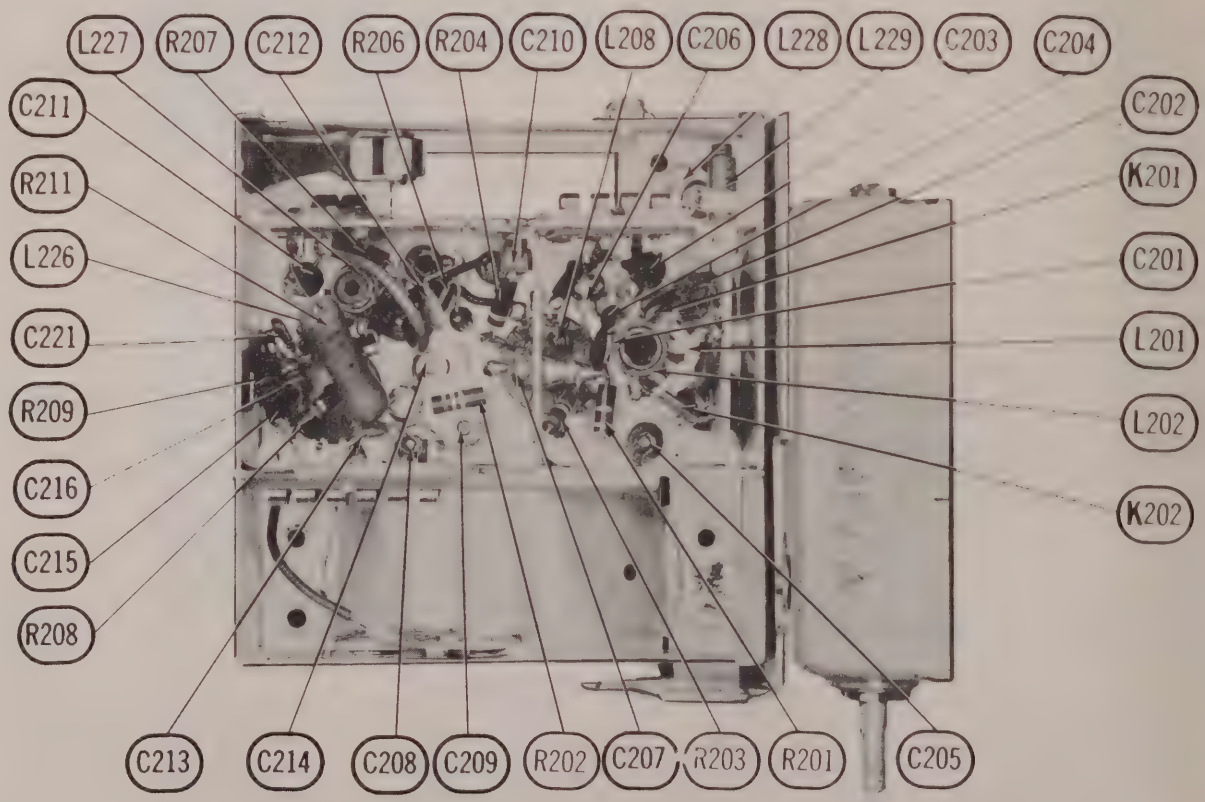
VHF TUNER 94D151-5, -6



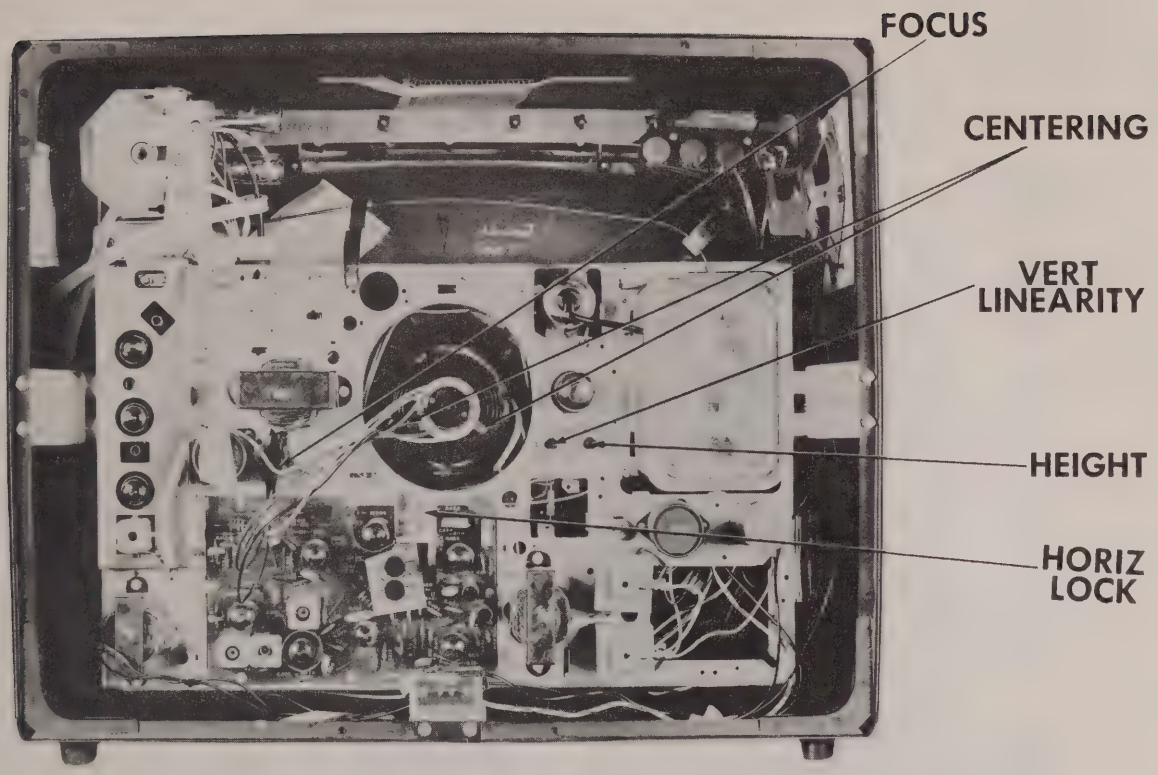
DRIVE CORD STRINGING



TUNER 94E144-9 - TOP VIEW



TUNER 94E144-9 - BOTTOM VIEW



CABINET—REAR VIEW

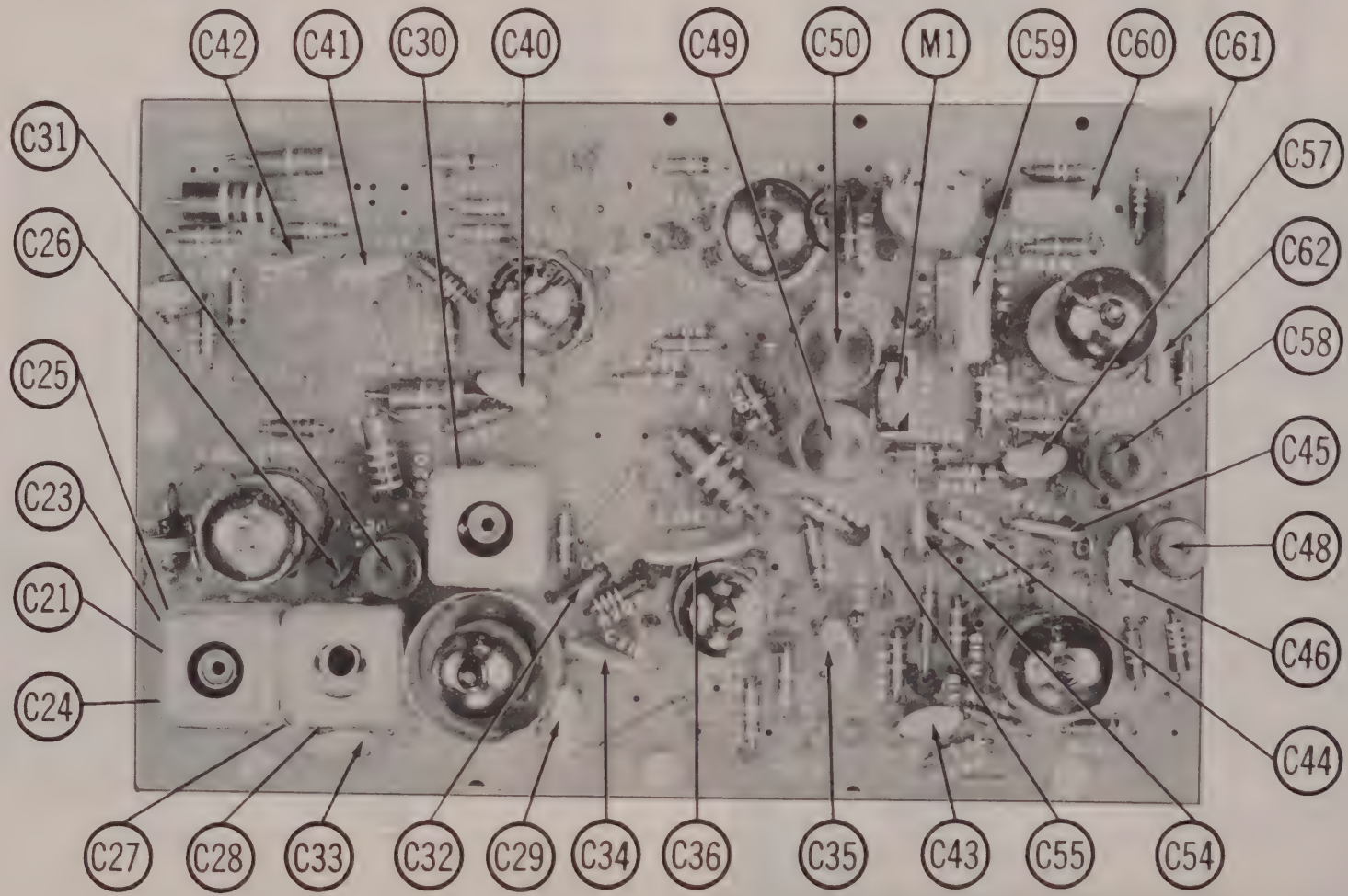
HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably with a test pattern.

Set the Brightness and Contrast for a normal picture.

Turn the Horizontal Lock clockwise until picture loses sync. It may be necessary to switch off channel and back again for picture to lose sync.

Turn the Horizontal Lock slowly counterclockwise until the picture just falls into sync.



MAIN PRINTED BOARD - CAPACITOR IDENTIFICATION

ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

Use an ISOLATION TRANSFORMER to PROTECT the Test Equipment.
The high voltage lead should be securely taped and kept away from the chassis.
Allow a 20 minute warm-up period for the receiver and test equipment.
Suggested Alignment Tools: GENERAL CEMENT #8606, 8606L, 8282, 9295
WALSCO #2526, 2543, 2544, 2545

VIDEO IF ALIGNMENT

Connect the negative lead of a 3 volt bias supply to point (A) thru a 10K resistor. Positive to chassis.
Connect a jumper across the antenna terminals.
Connect a 270mmf capacitor across the VTVM leads.
In the sets containing a Super Range Finder Control, set fully counterclockwise.
Set Contrast control fully clockwise.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	Direct	High side to ungrounded tube shield floating over Mixer-Osc. tube (V202). Low side to chassis.	41.25 MC (Unmod)	Any non-interfering channel	DC probe thru 47K to point (B). Common to chassis. (Across Video Det. load)	A1	Use high generator output. Adjust for MINIMUM deflection.
2.	"	"	47.25MC	"	"	A2	"
3.	"	"	42.3MC	"	"	A3	Use only enough generator output to provide a usable indication on VTVM. Adjust for maximum deflection.
4.	"	"	45.3MC	"	"	A4, & Mixer Plate Coil	"
5.	"	"	41.5MC	"	"	A5	"
6.	"	"	42.0MC	"	"	A6	"
7.	"	"	43.5MC	"	"	A7	"

OVERALL VIDEO IF RESPONSE CHECK

Connect the negative lead of a 3 volt bias supply to point (A). Positive to chassis.
In the sets containing a Super Range Finder Control, set fully counterclockwise.
Set Contrast fully clockwise.
If an external marker is used, couple loosely to sweep generator lead.
Connect a 270mmf capacitor across the scope leads.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8.	Direct	High side to ungrounded tube shield floating over Mixer-Osc. tube (V202). Low side to chassis.	43MC (10MC Swp)	41.25MC 42.0MC 43.5MC 45.0MC 45.75MC 47.25MC	Any non-interfering channel	Vert. Amp. thru 47K to point (B). Low side to chassis. (Across Video Det. load)		Check for response similar to Fig. 1 with markers as shown. If necessary, retouch Mixer Plate Coil to position 45.75 MC marker and A7 to position 43.5MC marker and to correct shape of curve.

SOUND IF ALIGNMENT

Tune in the strongest TV station available in the area. Adjust the set for normal operation.
Turn A8 slowly counterclockwise until a buzz is heard in the sound, then turn clockwise for maximum undistorted sound. (There may be two points approximately 1/2 turn apart at which the sound is loud. Set slug at center range of second loud point as slug is turned clockwise).
Reduce the signal at the antenna terminals (by use of an adjustable attenuator or disconnecting the antenna) until a strong hiss is heard in the sound. Carefully adjust A9 and A10 for maximum undistorted sound with MINIMUM hiss. If the hiss disappears during alignment, reduce the signal more until the hiss returns and readjust A9 and A10. If the sound is unsatisfactory, repeat procedure.

4.5MC TRAP ALIGNMENT

Adjust A11 for MINIMUM 4.5MC beat pattern in the picture. (4.5MC beat interference appears as a very fine crosshatch pattern on the screen.)

TUNER ALIGNMENT INSTRUCTIONS LOCATED ON PAGES 19 & 20

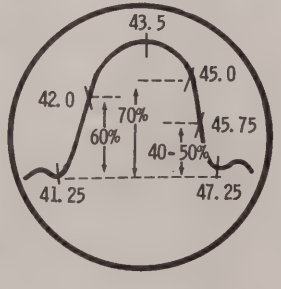


FIG.1

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No	USE	TYPE	NOTES
V1	1st Video IF Amp.	3BZ6	
V2	2nd Video IF Amp.	3BZ6	
V3	3rd Video IF Amp.	3CB6	
V4	Video Output-Sound IF Amp.	6AW8A	
V5	AGC Keying-Noise Limiter-Sync Sep	3BU8	
V6	Audio Det	3DT8	
V7	Audio Output	12CU5	
V8	Sync Phase Inv.-Vert. Mult	6CG7	
V9	Vert. Mult.-Vert. Output	12DB5	
V10	Horiz. Mult.	9CG7	
V11	Horiz. Output	12DQ6	
V12	Damper	19AU4GT	
V13	HV Rect.	1B3GT	

PICTURE TUBE

ITEM No	REPLACEMENT DATA				NOTES
	ADMIRAL PART No.	GENERAL ELECTRIC PART No.	RCA PART No.	SYLVANIA PART No.	
V14	21CEP4A		21CEP4 ①	21CEP4 ②	① "Silverama" ⑮ ② "Silver Screen 85"

ELECTROLYTIC CAPACITORS

ITEM No	RATING		REPLACEMENT DATA						NOTES
	CAP	VOLT	ADMIRAL PART No	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No	PYRAMID PART No	SPRAGUE PART No.	
C1	150	150	67D25-303	AFH1-37-25	XA0366	FP17.5	TM5-34	TVL-1430	
C2A	▲100	300	67D25-306	AFH2-41-50	BD332	FP327.7	TMT-165	TVL-3541	
B	▲100	300							
C3A	▲20	200	67D25-307	AFH4-46-20	DD032	FP454.2		TVL3-4475*	
B	▲5	200			BR505				
C	▲60	200							
D	50	50							
C4	40	200	67A25-3	PR8250V40	BR4025	TC58	TD-40-250	TVA-1511	
C5A	▲50	300	67D25-304	AFH3-41	C0330	FP396.3	TMT-47	TVL3-3575.5	
B	▲10	300							

* Not normally in distributors stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING			REPLACEMENT DATA						NOTES
	CAP.	VOLT	TOL	ADMIRAL PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C6	14		NPO 5%	65D6-40		539-7			5TCC-Q14S 5% *	
C7	.8-8			66A38-5						
C8	18		NPO 5%	65D10-121		TCZ-18	22R5Q18	CNO-415	5TCC-Q18S 5% *	
C9	3-18			66A38-7						
C10	330			65D10-51	BPD-0008	DD-S21	BYA10T82	B-383	5GA-T83	
C11	1.0	100		64A10-3	P388N-1.0		CUB3W1	GEM-21	2TM-M1	
C12	330			65D10-51	BPD-0008	DD-S21	BYA10T82	B-383	5GA-T83	
C13	330			65D10-51	BPD-0008	DD-S21	BYA10T82	B-383	5GA-T83	
C14	330			65D10-51	BPD-0008	DD-S21	BYA10T82	B-383	5GA-T83	
C15	330			65D10-51	BPD-0008	DD-S21	BYA10T82	B-383	5GA-T83	
C16	330			65D10-51	BPD-0008	DD-S21	BYA10T82	B-383	5GA-T83	
C17	560		N3300 5%	65D6-131						
C18	5000			65D10-5	BPD-005	DD-502	BYA10D5	B-250	5HK-D5	
C19	3.3		NPO 10%	65D6-89	NPO-DI 3.3	DTZ-3R3	C10V33C	CNO-533	5TCCB-V33S10%	
C20	8.8		10%	65B41-088	DI-8.8	TCZ-8R8	C10V88C	ZT-5568	5TCCB-V88S10%	
C21	47		NPO 5%	65D10-92	NPO-DI 47	DTZ-47		CNO-447	5TCC-Q47S 5% *	
C22	.22	600		64B8-24	P488N-22		CUB4P22	GEM-4022	4TM-P22	
C23	4.7		10%	65B28-047	NPO-DI 4.7	TCZ-4R7	C10V47C	ZT-5547	5TCCB-V47S10%	
C24	47		NPO 5%	65D10-80		DTZ-47	C10Q47C	CNO-447	5TCC-Q47S 5% *	
C25	47		NPO 5%	65D10-93		DTZ-47	C10Q47C	CNO-447	5TCC-Q47S 5% *	
C26	1000			65D10-53	BPD-001	DD-103	BYA10D1M	B-310	5HK-DI	
C27	4.5		5%	65B27-045					5TCCB-V45S5% *	
C28	82		NPO 5%	65D10-98		DTZ-82	C10Q82C	CNO-482	5TCC-Q82S 5% *	
C29	300			65D10-41	BPD-00003	DD-301	L10T5	B-333	5GA-T3	
C30	18			65D10-140						
C31	.047	200		65C16-55		P388N-047	DF-503	BC2847J	ACE-4147	4SF-S47
C32	4700			65D10-113	BPD-0047	DD-472	BYA10D47M	B-347	5HK-D47	
C33	10000			65D10-61	BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C34	10000			65D10-61	BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C35	10000			65D10-61	BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C36	10000	1400		65D20-98	DAC-27		HYE18S1	2HV-110	20HES1-S1	
C37	.022	600	10%	64B22-11			P86S22		6TM-S22S 10% *	
C38	.22	200			P288N-22		CUB2P22	GEM-2022	2TM-P22	
C39	.001	1600		64B2-32		DD30-102	CUB1K1D1	GEM-1621	MB-D1	
C40	10000			65D10-61	BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C41	10000			65D10-61	BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C42	150		N750	65D30-51	NPO-DI 150	DTN-150	C10T15U	CNT-315	5TCU-T15	
C43	4700			65D10-71	BPD-0047	DD-472	BYA10D47M	B-347	5HK-D47	
C44	4700			65D10-71	BPD-0047	DD-472	BYA10D47M	B-347	5HK-D47	
C45	10000			65D10-61	BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C46	2200			65D10-111	BPD-0022	DD-222	BYA10D22	B-322	5HK-D22	
C47	1000	2000		65D10-181	HVD-30-1000	DD30-102	HVB20D1	2HV-210	20GA-D1	
C48	.047	200	2% Drift	64C16-55					5SF-S47	
C49	.1	400		64C16-30		P488N-1	DF-104	BC5P1J	ACE-401	4SF-P10
C50	.1	400	2% Drift	64C16-130					5SF-P1	
C51	.047	600		64B8-24		P688N-047	DF-503	CUB6947	GEM-6147	6TM-S47
C52	.022	600	10%	64B22-11				P86S22		6TM-S22S 10% *
C53	.047	1000		64B2-30		P1088N-047		CUB10847	GEM-10147	10TM-S47
C54	1000		10%			DI-4000		PM6DI	JL-210	5GA-DI5 10% *
C55	1000		10%			DI-1000		PM6DI	JL-210	5GA-DI5 10% *
C56	.01	600				P688N-01	DD-103	CUB6S1	GEM-611	6TM-S1
C57	4700			65D10-113		BPD-0047	DD-472	BYA10D47M	B-347	5HK-D47
C58	.047	200		65C16-55		P288N-047	DF-503	BC2847J	ACE-4147	2SF-S47 ①
C59	3900		10%	65B28-392		1464-0039		1R5D39		MS-239
C60	820		10%	65B28-392		1466-00082		1R5T82		MS-382
C61	680		10%	65B28-681		1469-00068	DS-681	1R5T68		MS-368
C62	4700			65D10-112	BPD-0047	DD-472	BYA10D47M	B-347	5HK-D47	
C63	.047	600		64B8-24		P688N-047	DF-503	CUB6947	GEM-6147	6TM-S47
C64	.022	1500		64B2-43				CUB16822	GEM-1612	MB-S22
C65	.047	1000		64B2-30		P1088N-047		CUB10847	GEM-10147	10TM-S47
C66	330	2000	N1500 10%	65D30-186						
C67	330	2000	N1500 10%	65D30-186						

CAPACITORS (cont)

ITEM No	RATING			REPLACEMENT DATA						NOTES
	CAP.	VOLT	TOL	ADMIRAL PART No.	AEROVOX PART No	CENTRALAB PART No	CORNELL-DUBILIER PART No	MALLORY PART No	SPRAGUE PART No	
C68	120	2000	N150 10%	65D10-148						
C69	820			65D10-91	BPD-0008	DD-821	BYA10T82	B-383	5GA-T82	
C70	820			65D10-91	BPD-0008	DD-821	BYA10T82	B-383	5GA-T82	
C71	820			65D10-91	BPD-0008	DD-821	BYA10T82	B-383	5GA-T82	
C72	820			65D10-91	BPD-0008	DD-821	BYA10T82	B-383	5GA-T82	
C73	.047	600		64B2-38	P688N-047	DF-503	CUB6847	GEM-6147	6TM-S47	

① Some versions may use .022mfd ③ 200V in this application (Part #64C16-57).
* Not normally in distributors stock. Available thru distributor on order to manufacturer.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	ADMIRAL PART No	CENTRALAB PART No	CLAROSTAT PART No	IRC PART No.	MALLORY PART No.	
R1A	1meg	½	75D1-94	AB-70	A47-1meg-Z	Q31-137	U53	Volume
B	Shaft			AK-8	RS-3/8	NQ	DS-57	
C	Switch			KB-1 or KR-1*	SWK-12	T6-4	U6-36	
R2A	100K	½	75D13-94	AB-40	A47-100K-B	Q31-136	U41	Brightness
B	Shaft			AK-8	RS-3/16	NQ	DS-37	
R3A	1000Ω	½	75D13-93	AB-506	A47-1000-S	Q17-108	U3	Contrast
B	Shaft			AK-8	RS-3/16	NQ	DS-37	
R4A	200K	½	75D13-92	AB-46	A47-200K-B	Q31-129	U42	Vert. Hold
B	Shaft			AK-8	RS-3/16	NQ	DS-37	
R5A	500Ω	½	75D20-103	AB-4	A47-500-S	Q31-138	PTA52L	Vert. Lin.
B	Shaft			AK-1	FKS-1/4	TQ	Not Req.	
R6A	1 Meg	½	75D30-105	BK-742	A47-1 Smeg-B	Q31-138	TA85L	Height
B	Shaft			Not Req.	FKS-1/4	TQ	Not Req.	

* Use KB with CRL "blue label" controls, and KR with "red label" controls.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		ADMIRAL PART No.	NOTES
	OHMS	WATT		
R7	1800Ω	3	60B8-182	
R8	1800Ω			Note 1
R9	10meg		60B8-106	
R10	2.2meg		60B8-225	
R11	150K		60B8-154	
R12	4.7meg		60B8-475	
R13	10K		60B8-103	
R14	10000		60B8-103	
R15	4700Ω		60B8-472	
R16	39K		60B8-393	
R17	470Ω		60B8-471	
R18	22K		60B8-223	
R19	220K		60B8-224	
R20	47Ω		60B8-470	
R21	220K		60B8-224	
R22	4700Ω		60B8-472	
R23	470Ω		60B8-471	
R24	68Ω		60B8-680	
R25	470Ω		60B8-471	
R26	150Ω		60B8-151	
R27	3900Ω		60B8-392	
R28	100Ω		60B8-101	
R29	3300Ω	2	60B20-333	
R30	1500Ω	1	60B14-152	
R31	8200Ω		60B8-822	
R32	220Ω		60B8-221	
R33	2200Ω		60B8-222	
R34	82K		60B8-823	
R35	39K		60B8-393	
R36	120K		60B8-124	
R37	390K		60B8-394	
R38	8200Ω	1	60B14-822	
R39	680Ω		60B8-681	
R40	47K	1	60B14-473	
R41	330K		60B8-334	
R42	100K		60B8-104	
R43	560K		60B8-564	
R44	8200Ω		60B8-822	
R45	680Ω		60B8-681	
R46	150Ω		60B8-151	
R47	1.2meg 5%		60B7-125	
R48	1meg 5%		60B7-105	
R49	220Ω	2	60B20-221	
R50	47K		60B8-473	

ITEM No.	RATING		ADMIRAL PART No.	NOTES
	OHMS	WATT		
R51	4.7meg		60B8-475	
R52	56K		60B8-563	
R53	270K		60B8-274	
R54	15K		60B8-153	
R55	4.7meg		60B8-475	
R56	2.2meg		60B8-225	
R57	6800Ω		60B8-682	
R58	5600Ω		60B8-562	
R59	2200Ω		60B8-222	
R60	3300Ω		60B8-332	
R61	15K		60B8-153	
R62	15K		60B8-153	
R63	220K		60B8-224	
R64	220K		60B8-224	
R65	470K		60B8-474	
R66	56K		60B8-563	
R67	2.2meg		60B8-225	
R68	100Ω		60B8-101	
R69	18K	1	60B14-183	
R70	470Ω	3	61B24-317	
R71	220Ω	1	60B14-221	
R72	220Ω			
R73	3.8Ω Cold		61A27	
R74	330Ω			
R75	22K	3	60B20-223	
R76	100K 5%		60B7-104	
R77	100K 5%		60B7-104	
R78	4.7meg		60B8-475	
R79	470K		60B8-474	
R80	10K		60B8-103	
R81	1200Ω		60B8-122	
R82	47K		60B8-473	
R83	82K		60B8-823	
R84	15K		60B8-153	
R85	1meg		60B8-105	
R86	100Ω		60B8-101	
R87	12K	3	61A1-45	
R88	150K		60B8-154	
R89	470K		60B8-474	
R90	4700Ω		60B8-472	
R91	1.2Ω		60B28-84	
R92	250Ω 5%	10	61B20-24	
R93A	4Ω	10	61B3-31	
B	13Ω			

Note 1. Ch. 16RIC, 16SIC use 2700Ω 2W in this application and Ch. 16RICB, 16SICB use 10K 3W in this application.

COILS (RF-IF)

ITEM No	USE	REPLACEMENT DATA					NOTES
		ADMIRAL PART No	Meissner PART No	Merit PART No	Miller PART No	Ram PART No	
L1	47 25MC Trap	73B37-3	19-1001	BC-562	4604		
L2	41.25MC Trap	73B37-3	19-1001	BC-562	4604		
L3	1st Video IF	72C132-31					
L4	2nd Video IF	72C132-38					Note 1
L5	3rd Video IF	72C132-38					Note 1
L6	4th Video IF	72B1W-2					
L7	Resonant Choke	73B34-7					7.7 Microhenries
L8	Shunt Peaking Coil	73B5-20	19-3500	TV-303	6174	VP-8	500 Microhenries
L9	Resonant Choke	73B21-2					28 Microhenries
L10	Series Peaking Coil	73B5-28	19-3180 *	TV-184 *	6180 *	VP-5 *	180 Microhenries, wound on 4700Ω resistor
L11	Shunt Peaking Coil	73B5-36					
L12							
L13	2nd Sound IF	72B186-1					
L14	Quadrature Coil	72C132-37					
L15	Fil Choke	73B37-2	19-1001	BC-562	4604		1.4 Microhenries
L16	Line Choke	73B31-1					68 Microhenries

Note 1. Ch. 16RICB and 16SICB use Part #72C132-39 in this application.
* Parallel with 4700Ω resistor.

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES.		REPLACEMENT DATA						NOTES
	PRI	SEC	ADMIRAL PART No	Meissner PART No	Merit PART No	Miller PART No	Ram PART No	Thordarson PART No	
L17	40Ω		94C17-4		TV-164			HS-10	Horiz. Lock

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA						
	CURRENT (Measured)	DC RES.	INDUCTANCE (0 CURRENT 1000 ^L)	ADMIRAL PART No	Halldorson PART No.	Merit PART No	Ram PART No	Stancor PART No.	Thordarson PART No.	Triad PART No
L18	.250A	43Ω	1.5 Hy.	74B18-23	C5037	C-2996		C-2328	26C93	C-17X

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA							
		ADMIRAL PART No	Halldorson PART No.	Merit PART No	Ram PART No	Rogers PART No	Stancor PART No	Thordarson PART No.	Triad PART No
T1	Vert. Output	79B43-14			V319				A-113X①
T2	Yoke (Horiz.18MH) (10°) (Vert. 13MH)	94C160-3 ②			Y-110 ④		DY-27A ④⑤	Y-53 ④	Y-60 & NW23 & YC-110
	Alt. Yoke	94D147-3 ③							YC-110 ③
	Rear Cover & Centering Device	94C152 ③							
	Yoke Clamp	94C148-1 ③							
T3	Horiz. Output	79D77-4			X162 *	EFR172 *	HO-304 *	FLY-137 *	D-151H

① Connect as autoformer.
② 3 1/4" Diameter
③ 3 3/4" Diameter.
④ Requires new rear cover and centering device.
⑤ Use original damping network, if necessary.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

	ORIGINAL TERMINAL CONNECTIONS	Halldorson Replacement Connections	Merit Replacement Connections	Ram Replacement Connections	Rogers Replacement Connections	Stancor Replacement Connections	Thordarson Replacement Connections	Triad Replacement Connections
	5			5	5	5	5	
	6		6	4	6	6		
	7		7	2	7	7		
	8		8	1	8	8		
	2	1	7	2	1			
	1	2	8	1	2			
Special Notes →			①					

① Remove one turn from filament winding.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	ADMIRAL PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No	
T4	2500Ω	3-4Ω	79B78-1	Z1104	A-3025 ①	AU-607	A-3876 ①	26S50 ①	S-4X	① Drill new mounting hole.

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	ADMIRAL PART No.	QUAM PART No.	
SP1	4"	PM	3-4Ω	78B136-1	4A07	

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	ADMIRAL PART No	REPLACEMENT DATA	
K1	Chassis Isolation	470mmf, .75-1.5meg	63B10-3 ①	Centralab RC-490 Sprague AC1-2 ① Alternate Part #63B10-1	

RECTIFIERS

ITEM No.	RATING		REPLACEMENT DATA					NOTES
	CURRENT (Measured)		ADMIRAL PART No	FEDERAL PART No	GENERAL ELECTRIC PART No	INTERNATIONAL PART No	SARKES TARZIAN PART No.	
M1	.250A		93A4-4 ①	1241AH 1 HA504 ②	1N1008 ②	T350 1 TV500 ②	350A 1 40K ②	① Selenium Type ② Silicon Type
M2	.250A		93A4-4 ①	1241AH 1 HA504 ③	1N1008 ③	T350 1 TV500 ②	350A 1 40K ②	③ Germanium Type ④ 2 Used
M3			93B5-4 ①	KM48 ③		BD-N ③④		

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			ADMIRAL PART No		LITTELFUSE PART No.		BUSS PART No	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M4	N	1 6/10A 125V 8/B	94A13-42		3330.6 (N-1 6/10A-8/B)	346016	N 1 6/10	HN 1 3/10 to 1 3/4

ADMIRAL MODELS C2E21E1E, 12E 13E, C4E21E1E, 12E, 13E, 721E21E, 22E, 23E, TA21E21E, 22E, 23E (Ch. 16ARIC, 16ASIC, 16RIC, CB, 16SIC, CB)

FOLDER 1

PARTS LIST AND DESCRIPTIONS (Continued)

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		ADMIRAL PART No.	CBS PART No.	SYLVANIA PART No.	
M5	K6 *		1N60	1N295	Video Detector (Pigtail) * Some versions may use 1N60, 1N87 or 1N295 in this application.

MISCELLANEOUS

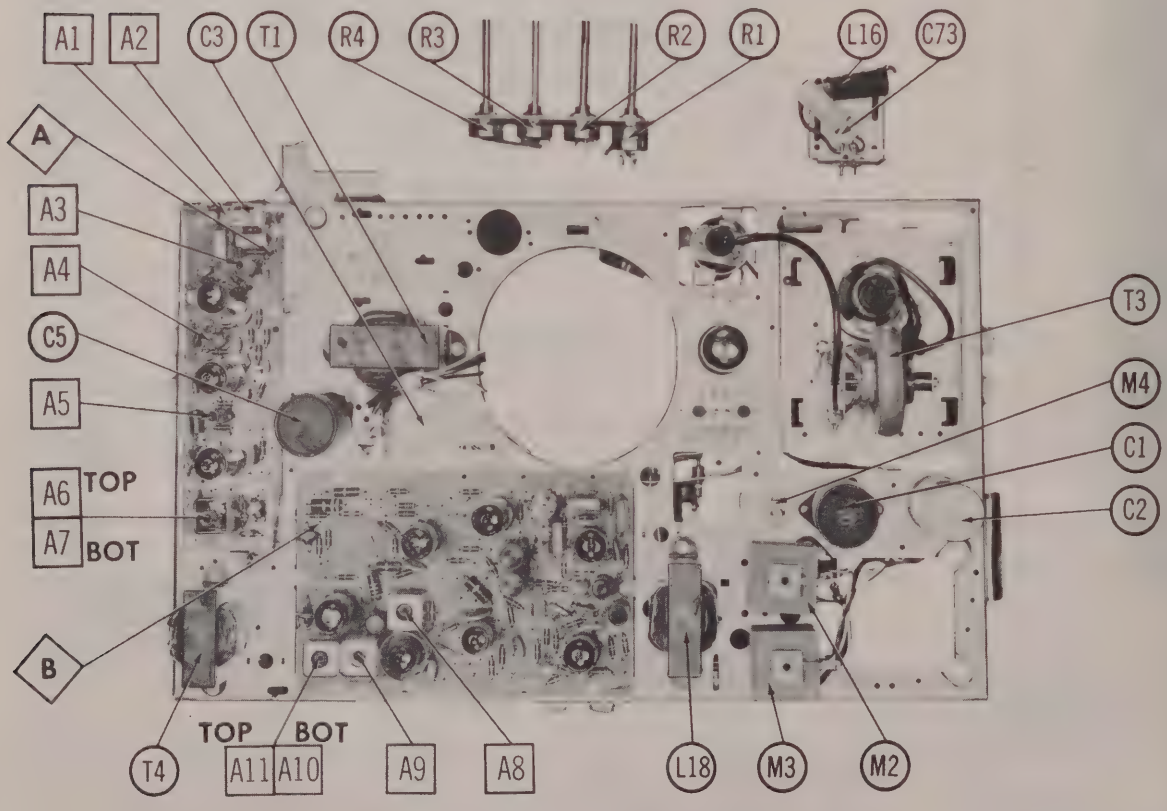
ITEM No.	PART NAME	ADMIRAL PART No.	NOTES
M6	Tuner	94E144-9	VHF with UHF provisions, Ch. 16AR1C
	Tuner	94E144-22	VHF with UHF provisions, Ch. 16AS1C
	Tuner	94E144-13	VHF, Ch. 16R1C
	Tuner	94E144-24	VHF, Ch. 16S1C
	Tuner	94D151-5	VHF, Ch. 16R1CB
	Tuner	94D151-6	VHF, Ch. 16S1CB
M7	Tuner	94D155-3	UHF, Ch. 16AR1C, 16AS1C
	Printed Board	14E214-5	Main
	Printed Board	14E213-1	Video IF

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

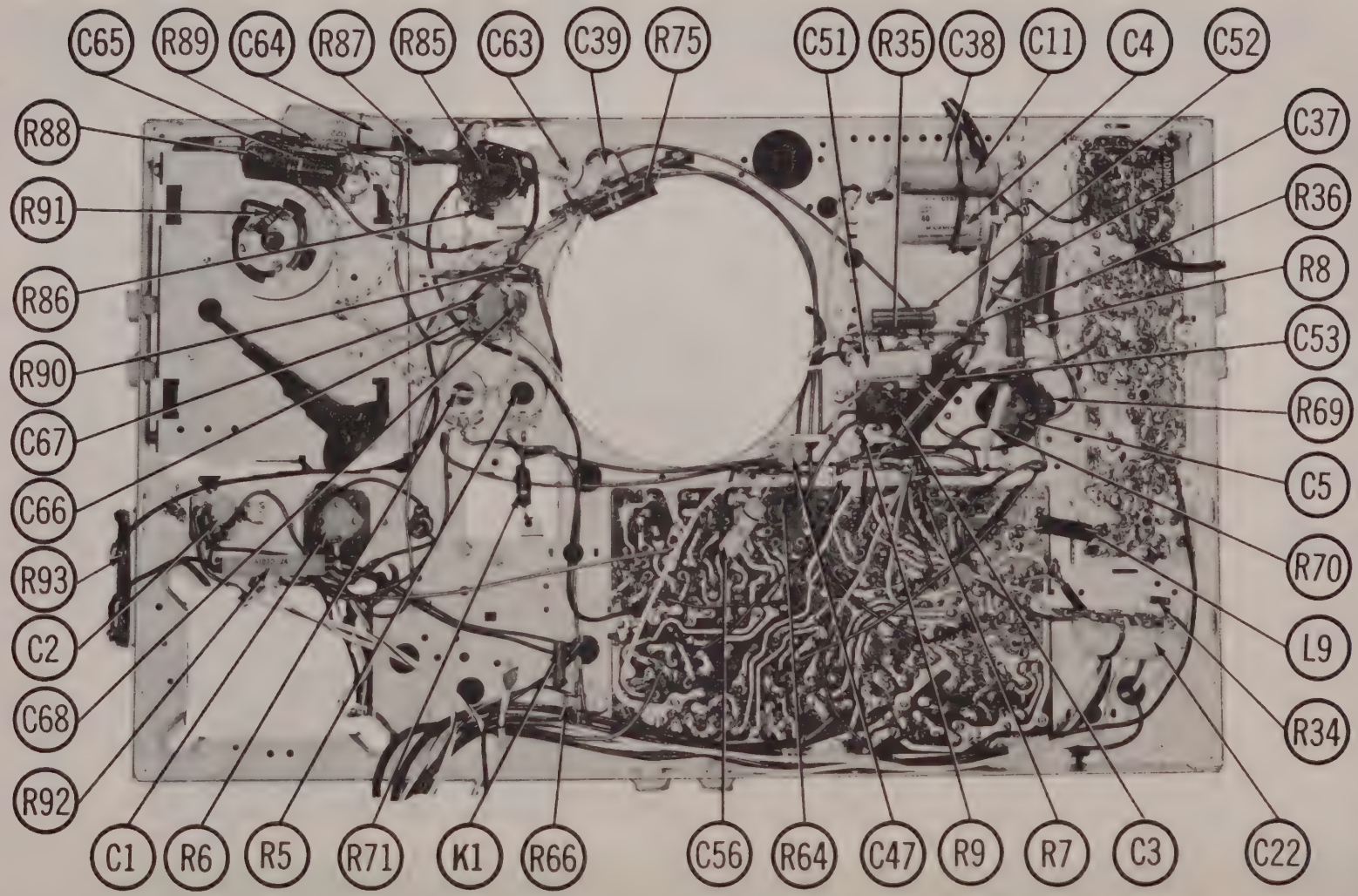
WIRING DATA

High Voltage Lead	Use BELDEN No.	8869
Shielded Hook-up Wire	Use BELDEN No.	8885 (Single Conductor) 8738 (Two Conductor)
General-use Unshielded Hook-up Wire	Use BELDEN No.	8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord (Interlock Type)	Use BELDEN No.	8874
300Ω Tuner Input Lead	Use BELDEN No.	8225
300Ω Antenna Lead-in	Use BELDEN No.	8230 or 8275
Antenna Rotor Cable	Use BELDEN No.	8464 (Flat) or 8484 (Round) - 4 Conductor 8485 (Round) - 5 Conductor 8488 (Round) - 8 Conductor

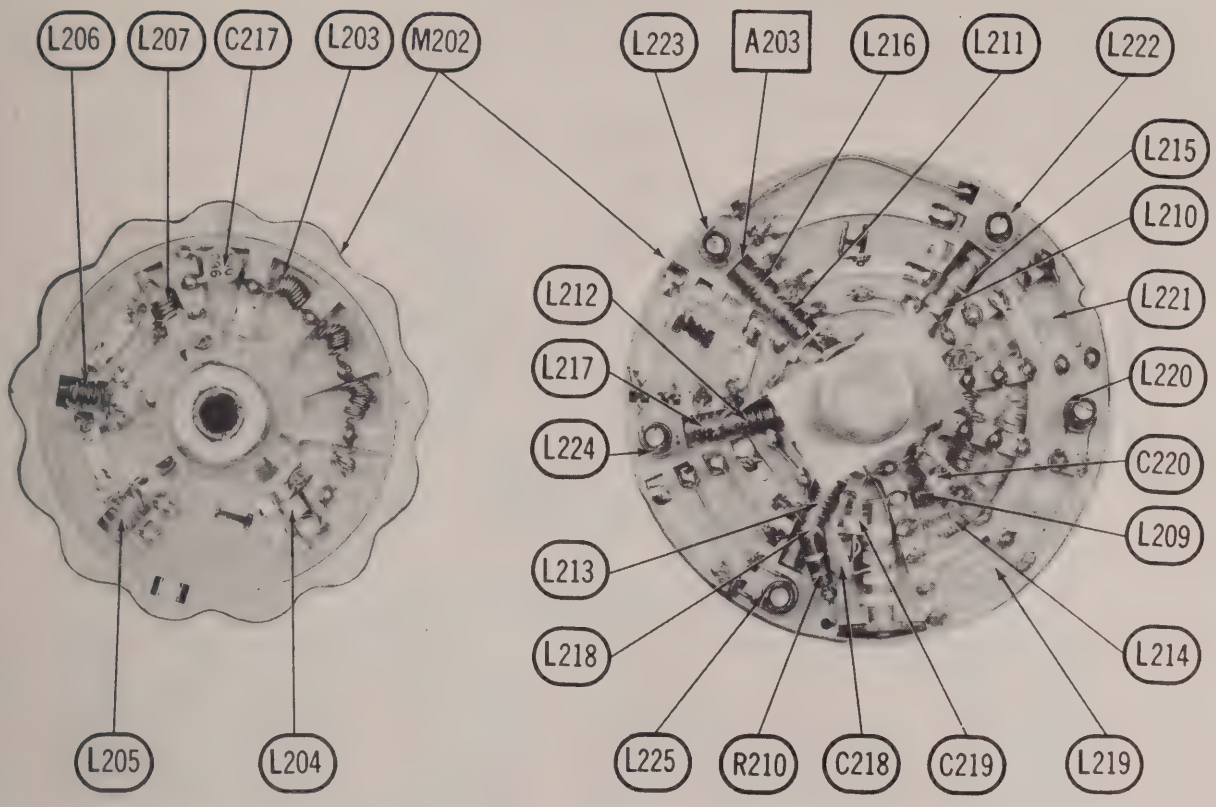


CHASSIS-TOP VIEW

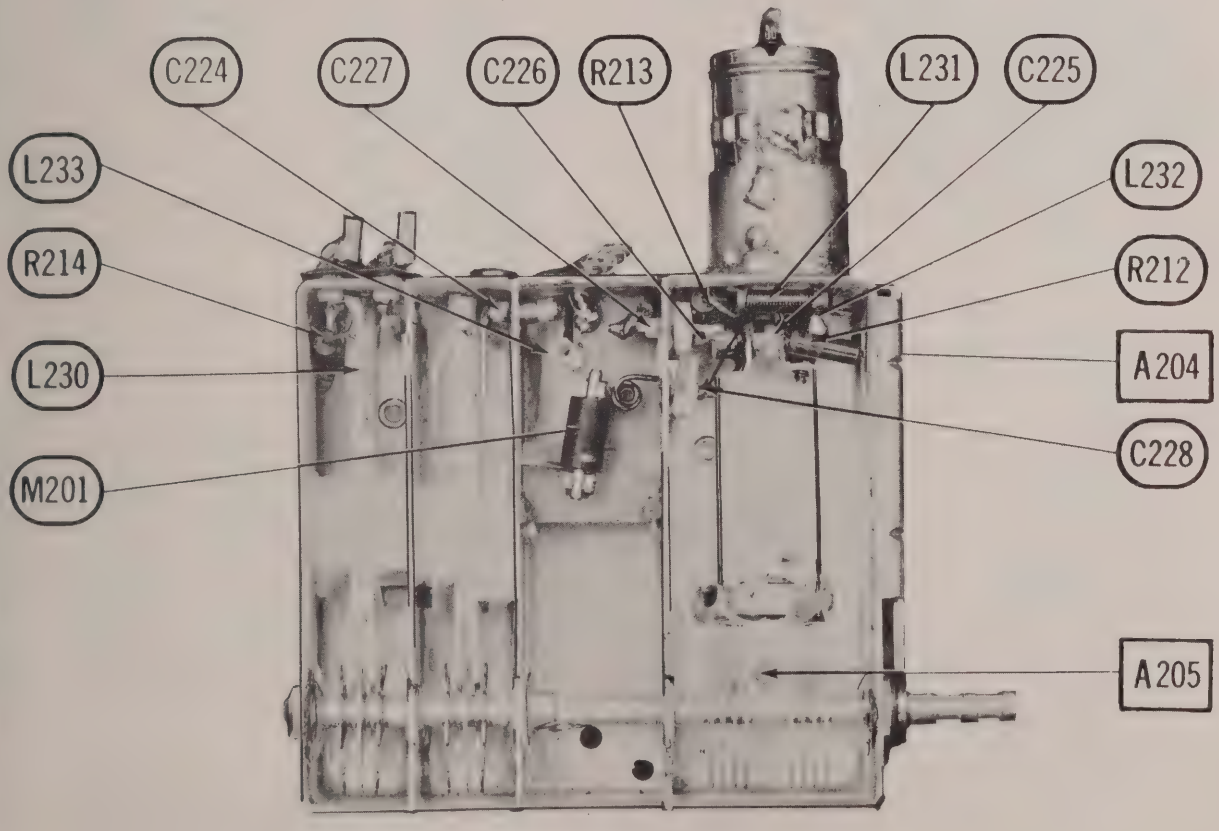
MAIN PRINTED BOARD - RESISTOR, INDUCTOR IDENTIFICATION



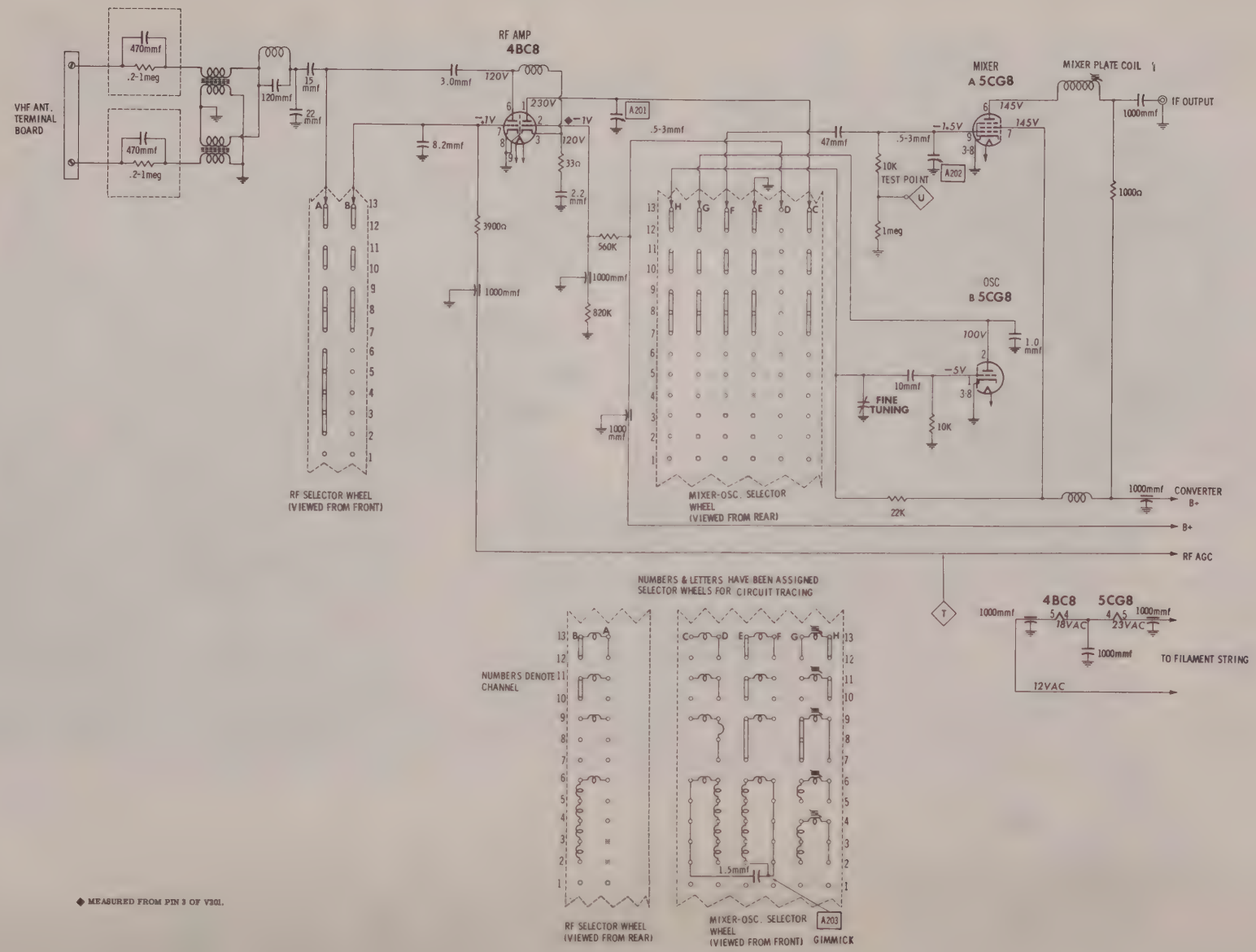
CHASSIS-BOTTOM VIEW



TUNER 94E144-9 - ROTOR



TUNER 94D155-3



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VHF TUNER 94E144-13, -24

TUNER PARTS LIST AND DESCRIPTIONS (cont)

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		ADMIRAL PART No.	CBS PART No.	SYLVANIA PART No.	
M201	1N82A	94D112-57	1N82A	1N82A	UHF Mixer (Clip In)

MISCELLANEOUS

ITEM No.	PART NAME	ADMIRAL PART No.	NOTES
M202	Rotor Disc	A5809	Includes Shaft
	Spring	18C140-3	Detent
	Spring	18A185	Cover Grounding

TUNER ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS FOR TUNERS 94E144-9, -13, -22, -24

Use an ISOLATION TRANSFORMER to PROTECT the Test Equipment.
Allow a 20 minute warm-up period for the receiver and test equipment.
Tuner shield must be in place during alignment.
Suggested alignment tools:
A201, A202 ..... GENERAL CEMENT #5004, 5008, 5009
WALSCO #2520
A204 ..... GENERAL CEMENT #9296, 9297
WALSCO #2546, 2547
Osc. Slugs ..... GENERAL CEMENT #8728, 8729, 8988, 8989
WALSCO #2531, 2532

VHF OSCILLATOR ALIGNMENT

Set Channel Selector to the lowest channel operating in the area. Set the Fine Tuning to the center of its range. Set other controls for normal picture and sound. Adjust oscillator slug for best picture and sound. If two slugs are visible adjust the one nearest the top of the tuner. Repeat procedure in sequence from lowest to highest for stations operating in the area.

VHF RF AND MIXER ALIGNMENT

Connect the negative lead of a 4 volt bias supply to point (T). Positive to chassis.
Set Super Range Finder (when used), fully counterclockwise.
Set Contrast fully clockwise.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough sweep generator output to provide a usable pattern on scope.
Use 10MC sweep unless otherwise noted.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	195MC	193.25MC 197.75MC	10	Vert. Amp. thru 10K to point (U). Low side to chassis.	A201, A202	Adjust for response similar to Fig. 201 with markers as shown.
2.	"	"	85MC	83.25MC 87.75MC	6	"	A203	Check for response similar to Fig. 201. Adjust for maximum amplitude and flat-topped appearance with markers properly positioned. Repeat steps 1 and 2.
3.	"	"	213MC	211.25MC 215.75MC	13	"		Check for response similar to Fig. 201. If satisfactory curve is not obtained on any channel operating in the area, compromise adjustments of A201 and A202 may be made favoring that channel. If a compromise adjustment is made, check other operating channels to see that they have not been seriously affected.
			207MC	205.25MC 209.75MC	12			
			201MC	199.25MC 203.75MC	11			
			189MC	187.25MC 191.75MC	9			
			183MC	181.25MC 185.75MC	8			
			177MC	175.25MC 179.75MC	7			
			79MC	77.25MC 81.75MC	5			
			69MC	67.25MC 71.75MC	4			
			63MC	61.25MC 65.75MC	3			
			57MC	55.25MC 59.75MC	2			

VHF IF ALIGNMENT FOR TUNERS 94E144-9, -22

Connect the negative lead of a 4 volt bias supply to point (T). Positive to chassis.
Set Super Range Finder (when used) fully counterclockwise.
Set Contrast fully clockwise.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough sweep generator output to provide a usable pattern on scope.
Use 10MC sweep unless otherwise noted.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
4.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	700MC	41.25MC 45.75MC	UHF	Vert. Amp. thru 10K to point (U). Low side to chassis.	A204	Adjust for maximum gain and symmetry of response similar to Fig. 202 with markers as shown.
5.	"	"	"	"	"	Vert. Amp. thru 47K with 270mmf across scope input connected across Video Det. load.		Increase bias at point (T) to 6 volts. Check for response similar to Fig. 203. If curve is incorrect repeat step 4 and make a compromise adjustment. Repeat step 5.

UHF OSCILLATOR ALIGNMENT FOR TUNER 940155-3

Turn UHF Channel Selector to a low channel, (below channel 50). Adjust A205 for best picture and sound. For channels 50 or higher, adjust A206 for best picture and sound.

TUNER ALIGNMENT INSTRUCTIONS (Con't)

PRE-ALIGNMENT INSTRUCTIONS FOR VHF TUNER 94D151-5, -6

Use an ISOLATION TRANSFORMER to PROTECT the Test Equipment.
Allow a 20 minute warm-up period for the receiver and test equipment.

VHF RF AND MIXER ALIGNMENT

Connect the negative lead of a 4 volt bias supply to point (T). Positive to chassis.
Set Super Range Finder control fully counterclockwise.
Set Contrast control fully clockwise.
Tuner shield must be in place during alignment.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough sweep generator output to provide a usable pattern on scope.
Use 10MC sweep unless otherwise noted.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	195MC	193.25MC 197.75MC	10	Vert. Amp. thru 15K to point (T). Low side to chassis.	A201, A202	Adjust for maximum gain and symmetry of response similar to Fig. 201 with markers as shown.
2.	"	"	85MC	83.25MC 87.75MC	6	"		Check for response similar to Fig. 201. If markers fall below 70%, make compromise adjustments of A201 and A202. Recheck response curve of step 1. If proper response cannot be obtained, proceed to step 3.
3.	"	"	195MC	193.25MC 197.75MC	10	"	A203	Increase bias at point (T) to 15 volts. Set sweep generator output to maximum. Increase scope gain to obtain a usable response. Adjust A203 for MINIMUM response. Repeat steps 1 and 2.
4.	"	"	213MC	211.25MC 215.75MC	13	"		Reset bias to 4 volts. Attenuate generator output for a usable response. Check for response similar to Fig. 201. If markers fall below 70% on any channel, make compromise adjustments of A201 and A202, with channel switch set to that channel. Check all other channels to see that they have not been seriously affected.
			207MC	205.25MC 209.75MC	12			
			201MC	199.25MC 203.75MC	11			
			195MC	193.25MC 197.75MC	10			
			189MC	187.25MC 191.75MC	9			
			183MC	181.25MC 185.75MC	8			
			177MC	175.25MC 179.75MC	7			
			85MC	83.25MC 87.75MC	6			
			79MC	77.25MC 81.75MC	5			
			69MC	67.25MC 71.75MC	4			
			63MC	61.25MC 65.75MC	3			
			57MC	55.25MC 59.75MC	2			

VHF OSCILLATOR ALIGNMENT

Set the Fine Tuning at the center of its range. The adjustments are accessible, one at a time, as the Channel Selector is rotated. Adjust for best picture and sound.

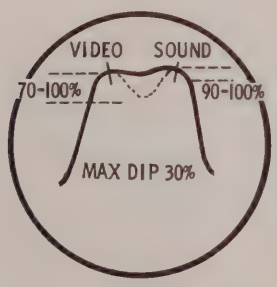


FIG. 201

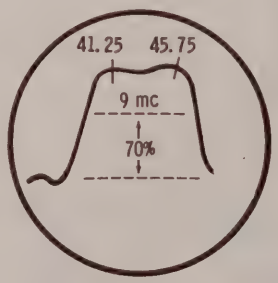


FIG. 202

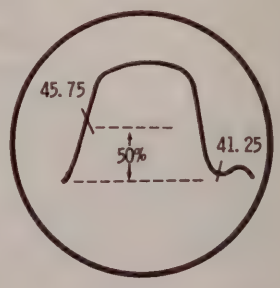


FIG. 203

CircuiTrace Numbers 11 thru 40

A Howard W. Sams CIRCUITRACE Photo

MAIN PRINTED BOARD

ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED

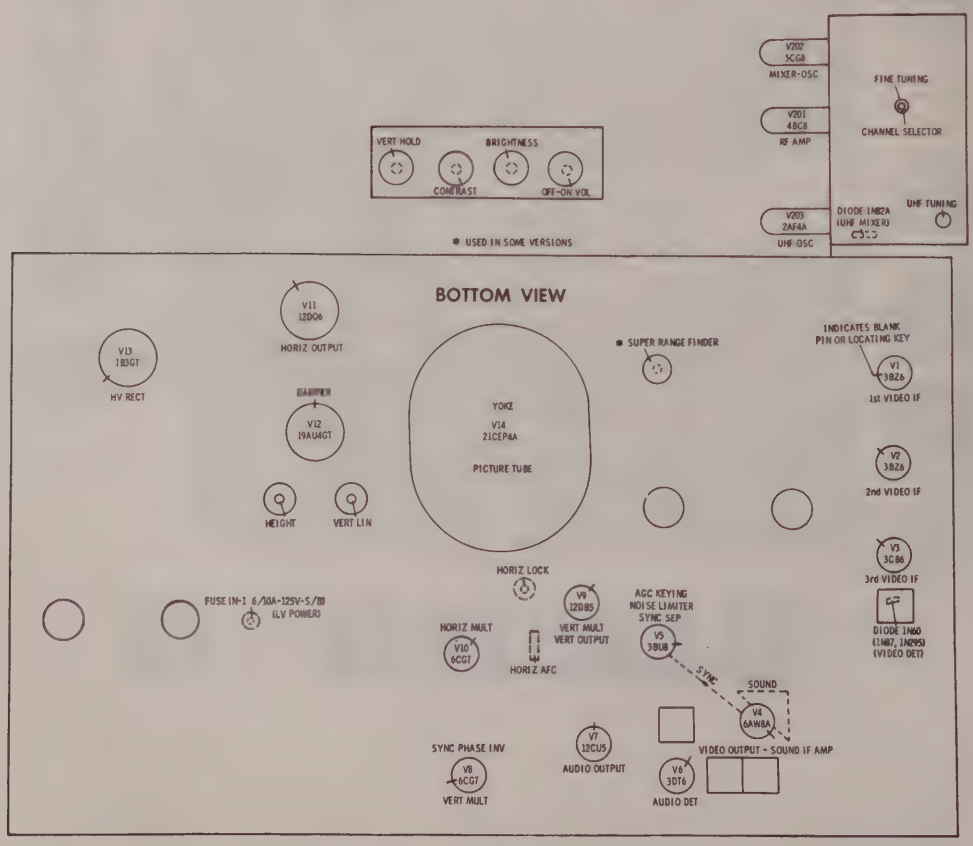
ADMIRAL MODELS C21611E, 12E, 13E, CA12611E, 12E, 13E, T21621E, 22E, 23E, TA21621E, 22E, 23E (Ch. 16AR1C, 16AS1C, 16R1C, CB, 16S1C, CB)

FOLDER 1

RESISTANCE MEASUREMENTS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	3BZ6	150K	47Ω	6Ω	7Ω	††470Ω	††470Ω	0Ω		
V2	3BZ6	110K	††68Ω	7Ω	8Ω	†470Ω	†470Ω	120K		
V3	3CB6	.1Ω	150Ω	8Ω	9Ω	■470Ω	■470Ω	0Ω		
V4	6AW8A	0Ω	100K	†47K	12Ω	14Ω	● 45Ω	4000Ω	■8200Ω	■5000Ω
V5	3BU8	■220Ω	†8200Ω	2.3meg	1.5Ω	2Ω	■12K	†390K	†40K	†4.7meg
V6	3DT6	9.5Ω	680Ω	9Ω	10Ω	†330K	■8200Ω	560K		
V7	12CU5	¶	550K	12Ω	10Ω	550K	†220Ω	†370Ω		
V8	6CG7	● †1.3meg	220K	●105K	1.5Ω	0Ω	†12K	1.6meg	3300Ω	0Ω
V9	12DB5	†18K	●400Ω	2.2meg	14Ω	16Ω	2.2meg	●400Ω	NC	†770Ω
V10	6CG7	†10K	3meg	1200Ω	16Ω	18Ω	†82K	47K	1200Ω	0Ω
V11	12DQ6	TP	20Ω	TP	†12K	1meg	TP	18Ω	0Ω	TOP CAP †8.5Ω
V12	19AU4GT	NC	NC	¶700K	NC	†0Ω	NC	23Ω	20Ω	
V13	1B3GT	PINS 1 THRU 8 HAVE INFINITE RESISTANCE								TOP CAP 465Ω
V14	21CEP4A	2Ω	39K	†120K	0Ω	NC	NC	● 100K	3.5Ω	
V201	4BC8	†1800Ω	350K	INF	4Ω	5Ω	INF	4.5meg	0Ω	0Ω
V202	5CG8	10K	■24K	0Ω	4Ω	3.5Ω	■2800Ω	■1800Ω	0Ω	1.4meg
V203	2AF4A	†•11K	•8200Ω	5Ω	6Ω	•0Ω	•8200Ω	†•11K		
ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
● THIS READING WILL VARY. CONTROL SET FOR NORMAL OPERATION.
† MEASURED FROM 255V SOURCE.
†† MEASURED FROM PIN 7 OF V2.
■ MEASURED FROM 150V SOURCE.
• MEASURED IN "UHF" POSITION.
‡ MEASURED FROM PIN 3 OF V12.
NC NO CONNECTION
TP TIE POINT



TUBE PLACEMENT CHART

PHOTOFACT* Folder

OLYMPIC CHASSIS HA, HAU, HB, HBU, HD, HDU, HF, HFU, HH, HHU, 134

IMPORTANT FILING NOTICE

The TV Folder for this envelope will be found among the first folders in this complete Set of folders.

Merely insert the corresponding folder on this model in this envelope to retain proper filing and indexing order.

OLYMPIC CHASSIS HA, HAU, HB, HBU, HD, HDU, HF, HFU, HH, HHU, 134

MODEL TB131 (Ch. HB)

OLYMPIC CHASSIS HA, HAU, HB, HBU, HD, HDU, HF, HFU, HH, HHU, 134

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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DATE 4–59 SET 438 FOLDER 2

SET 438 FOLDER 2

PHOTOFACT* Folder

OLYMPIC CHASSIS HA, HAU, HB, HBU, HD, HDU, HF, HFU, HH, HHU, 134

OLYMPIC CHASSIS HA, HAU, HB, HBU, HD, HDU, HF, HFU, HH, HHU, 134

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 7 push-on type knobs from the front.
2. Remove 2 metal screws holding rear cover. Remove the rear cover.
3. Remove picture tube socket and ground, yoke plug, HV and speaker leads.
4. Remove 3 bottom chassis bolts.
5. Remove 1 metal screw holding chassis at top rear.
6. Remove chassis from rear of cabinet.

MODEL TB131 (Ch. HB)

TRADE NAME	Olympic	MODELS	CHASSIS
		CA135, KA145, TA130	HA
		CA135U, KA145U, TA130U	HAU
		CB136, CB137, CB140, KB146, TB131	HB
		CB136U, CB137U, CB140U, KB146U, TB131U	HBU
		KD148, KD149	HD
		KD148U, KD149U	HDU
		CF410, CF411	HF
		CF410U, CF411U	HFU
		KH416, KH417	HH
		KH416U, KH417U	HHU
		KD149, U, KH416, U, KH417, U ..... Radio	134

MANUFACTURER	Olympic Radio & Television Inc., 34-01 38th Avenue, Long Island City 1, N.Y.
TYPE SET	Television Receiver
TUBES	VHF - Fifteen, UHF - Sixteen
POWER SUPPLY	110-120 Volts AC, 60 Cycle RATING 160 Watts, 1.45 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)

MODELS KA145, U, KB146, U, KD148, U USE RECORD CHANGER #RX25907-1. FOR SERVICE INFORMATION SEE SIMILAR UNIT IN PHOTOFACT SET 381 - FOLDER 11. MODELS KD149, U, KH416, U, KH417, U USE RECORD CHANGER #RX25909. FOR SERVICE INFORMATION SEE SIMILAR UNIT IN PHOTOFACT SET 436 - FOLDER 18.

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustment of the VHF Oscillator may be accomplished by removing the Channel Selector and Fine Tuning knobs. Set the Fine Tuning at the center of its range. Channel 13 adjustment is located at 10 o'clock. Slugs for channels 6, 4 and 2 are accessible one at a time through the hole located at 7 o'clock. Adjust in sequence from the highest to the lowest for best picture and sound.

SAFETY GLASS REMOVAL

Remove 4 wood screws holding safety glass metal trim at top. Tilt safety glass out and lift up to remove.

AGC

The AGC may be varied by means of a Range Switch. (For location, see tube placement chart.)

FOCUS

The focus may be varied by the position of a strap on the base of the picture tube. The strap can be connected between pins 6 and 10, or 6 and 1.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENTS

For adjustment of the Horizontal Multivibrator, it is necessary to remove the rear cover and supply power to set. Set the Horizontal Hold at the center of its range and adjust the Horizontal Frequency slug (B1) until the picture synchronizes horizontally. (For location, see tube placement chart.)

SOUND IF DETECTOR BUZZ ADJUSTMENT

Adjust Sound Clarifier, if set is so equipped, for maximum sound with MINIMUM buzz.

FUSE

One fuse is used for horizontal sweep circuit protection and 2 fuse wires for filament protection.

CENTERING

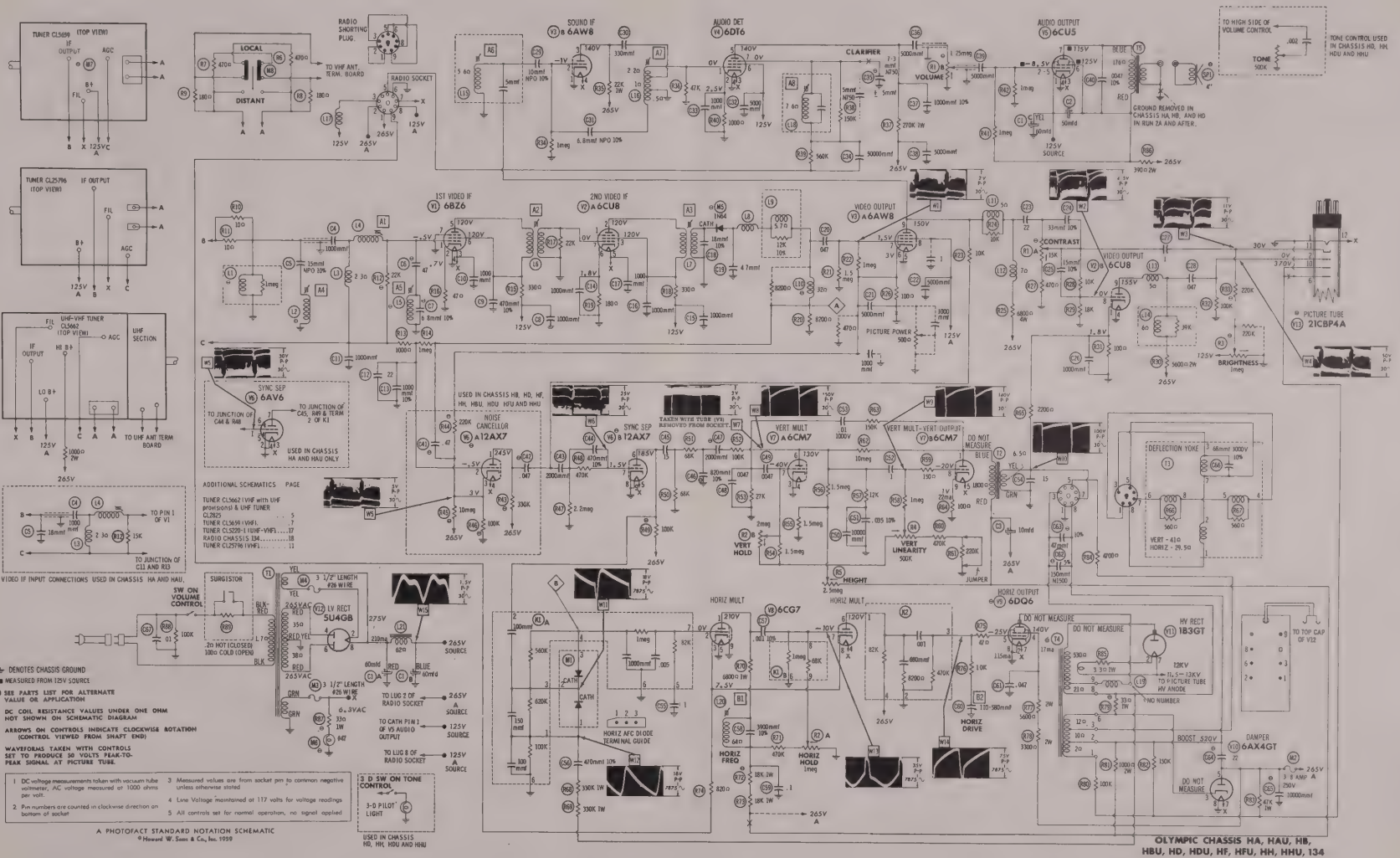
Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube. Rotate the two rings around the neck of the tube until the picture is properly centered.

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of H928

the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1959 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

SET 438 FOLDER 2


TUNER CL5699 (TOP VIEW)
TUNER CL25796 (TOP VIEW)
UHF-VHF TUNER CL5662 (TOP VIEW)
LOCAL
DISTANT
RADIO SHORTING PLUG
RADIO SOCKET
TO VHF ANT. TERM. BOARD
SOUND IF V3 6AW8
AUDIO DET V4 6DT6
AUDIO OUTPUT V5 6CU5
CLARIFIER
VOLUME
TONE CONTROL USED IN CHASSIS HD, HH, HDU AND HHU
GROUND REMOVED IN CHASSIS HA, HB, AND HD IN RUN ZA AND AFTER.
1ST VIDEO IF V1 6BZ6
2ND VIDEO IF V2 A6CU8
VIDEO OUTPUT V3 A6AW8
VIDEO OUTPUT V2 6CU8
CONTRAST
PICTURE TUBE V13 21CBP4A
BRIGHTNESS
SYNC SEP V6 6AV6
NOISE CANCELLOR V6 A12AX7
SYNC SEP V8 12AX7
VERT MULT V7 A6CM7
VERT MULT-VERT OUTPUT V7 6CM7
VERT HOLD
VERT LINEARITY 500K
HEIGHT
DEFLECTION YOKE
VERT - 41Ω
HORIZ - 29.5Ω
HORIZ MULT
HORIZ MULT V8 6CG7
HORIZ OUTPUT V9 6DQ6
HORIZ AFC DIODE TERMINAL GUIDE
HORIZ FREQ
HORIZ HOLD 1meg
HORIZ DRIVE
HV RECT V11 1B3GT
12KV
TO PICTURE TUBE HV ANODE
TO TOP CAP OF V12
DAMPER V10 6AX4GT
BOOST 520V
DO NOT MEASURE
SURGISTOR
SW ON VOLUME CONTROL
.20 HOT/CLOSED 100Ω COLD (OPEN)
LV RECT V12 5U4GB
265VAC
6.3VAC
TO LUG 2 OF RADIO SOCKET
TO CATH PIN 1 OF V5 AUDIO OUTPUT
TO LUG 8 OF RADIO SOCKET
3 D SW ON TONE CONTROL
3-D PILOT LIGHT
USED IN CHASSIS HD, HH, HDU AND HHU
USED IN CHASSIS HA AND HAU ONLY
USED IN CHASSIS HB, HD, HF, HH, HBU, HDU, HFU AND HHU
TAKEN WITH TUBE (V8) REMOVED FROM SOCKET
ADDITIONAL SCHEMATICS PAGE
TUNER CL5662 VHF with UHF prosponsl & UHF TUNER CL2825 5
TUNER CL5659 (VHF)..... 7
TUNER CL5209-1 (UHF-VHF)..... 17
RADIO CHASSIS 134..... 18
TUNER CL25796 (VHF)..... 11
VIDEO IF INPUT CONNECTIONS USED IN CHASSIS HA AND HAU.
DENOTES CHASSIS GROUND
MEASURED FROM 125V SOURCE
SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION
DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)
WAVEFORMS TAKEN WITH CONTROLS SET TO PRODUCE 30 VOLTS PEAK-TO-PEAK SIGNAL AT PICTURE TUBE.
1 DC voltage measurements taken with vacuum tube voltmeter. AC voltage measured at 1000 ohms per volt.
2 Pin numbers are counted in clockwise direction on bottom of socket
3 Measured values are from socket pin to common negative unless otherwise stated
4 Line Voltage maintained at 117 volts for voltage readings
5 All controls set for normal operation, no signal applied
A PHOTOFACT STANDARD NOTATION SCHEMATIC
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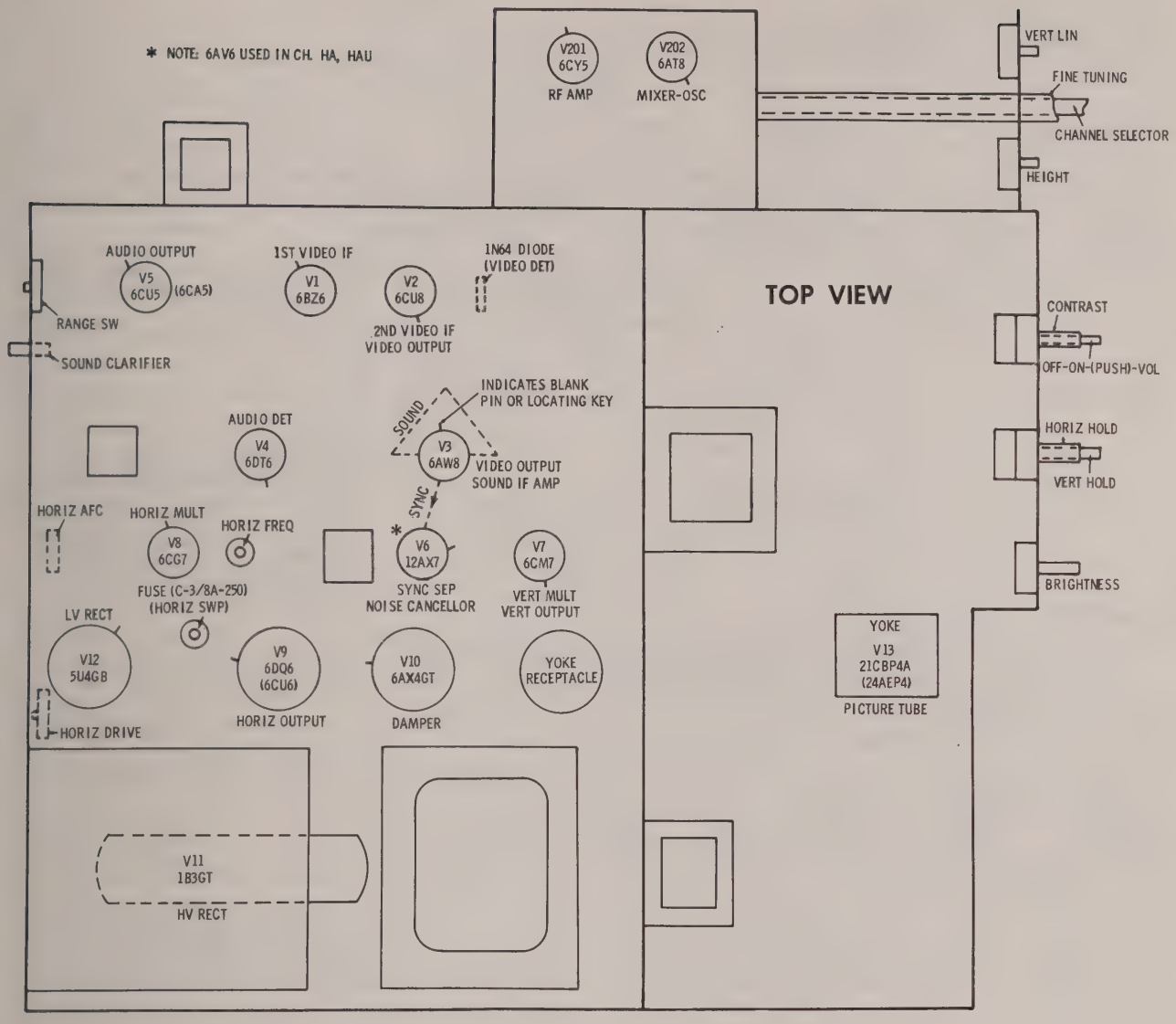
OLYMPIC CHASSIS HA, HAU, HB, HBU, HD, HDU, HF, HFU, HH, HHU, 134

TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound Fuse Wires (F1), V12

SWEEP FAILURE
No raster, has sound Rectifier (AFC), V8, V9, Fuse (3/8A), V10, V11, V13, V12
No vertical deflection V7
Poor vert. linearity or foldover V7
Poor horiz. linearity or foldover V8, V9, V10
Narrow picture V8, V9, V10, V12
Vert. off freq. V7
Horiz. off freq. V8

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster V1, V2, Diode (Video Det), V3
No pic, no sound, has snow V201, V202
No pic, has sound, has raster V3, V2, V13
Has pic, no sound V3, V4, V5

SYNC FAILURE
No vert. sync V6
No horiz. sync V6, Rectifier (AFC)
No vert. or horiz. sync V6

ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

The high voltage lead should be securely taped and kept away from the chassis.
Allow a 20 minute warm-up period for the receiver and test equipment.
Suggested alignment tools: Mixer Plate Coil, and A1 thru A6 .....GENERAL CEMENT #8282, 8606, 8606L or 9295
WALSCO #2543, 2544 or 2545
A7, A8 ..... GENERAL CEMENT #8721 or 8722
WALSCO #2519

VIDEO IF ALIGNMENT

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Direct	High side to ungrounded tube shield floating over Mixer-Osc. tube (V202). Low side to chassis.	Not used	44.5MC (Unmod)	Any non-interfering channel	USE VTVM. DC probe thru 100K to point (A). Common to chassis.	Mixer Plate Coil	Use only enough generator output to provide a usable indication on VTVM. Adjust for maximum deflection.
2.	"	"	"	45.5MC	"	"	A1	"
3.	"	"	"	43.5MC	"	"	A2	"
4.	"	"	"	45.5MC	"	"	A3	"
5.	"	"	"	47.25MC	"	"	A4, A5	Adjust for MINIMUM deflection. NOTE: Not used in Ch. HA, HAU.
6.	"	"	44.0MC (10MC Swp)	43.25MC 45.75MC 47.25MC	"	Vert. Amp. thru 100K to point (A). Low side to chassis.		Use only enough sweep generator output to provide a usable pattern on scope. Check for response similar to Fig. 1 with markers as indicated. If necessary, re-touch Mixer Plate Coil and A1 thru A5 for desired response.

SOUND IF ALIGNMENT

Preset the "Sound Clarifier", if so equipped, so that approximately 1/8" of brass screw threads extend beyond the screw clips.
Connect the DC probe of the VTVM thru a 1meg resistor to pin 1 (grid) of the 6DT6 (V4). Common to chassis. Turn the set on and tune in a strong TV signal. Adjust A6 and A7 for maximum deflection on the VTVM. Disconnect the VTVM and adjust A8 for maximum undistorted sound. Retouch A6 and A7 for maximum volume.

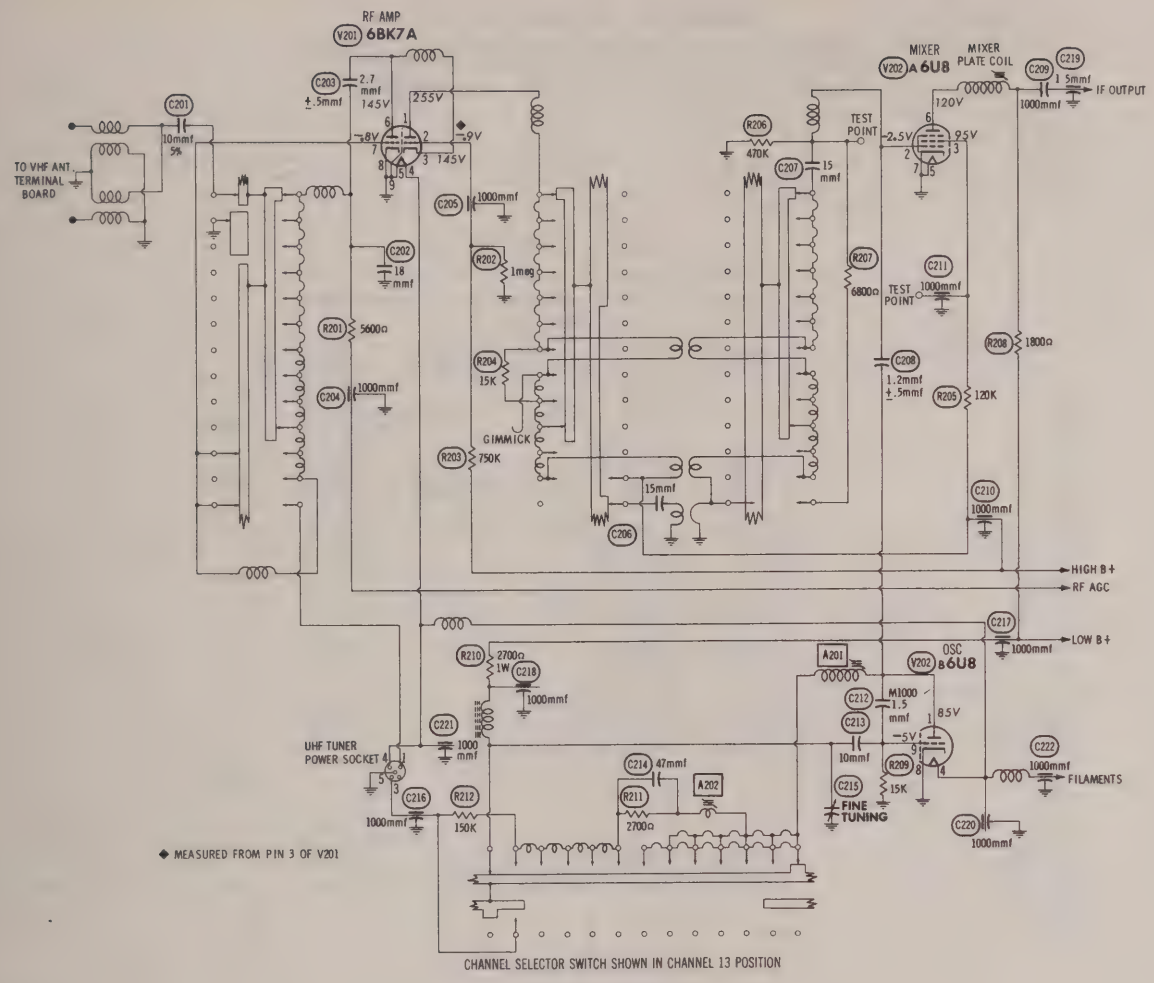
RADIO ALIGNMENT FOR CHASSIS 134

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
7.	.1mfd	High side to pin 7 (grid) of 12BE6 (Converter). Low side to B-.	455KC (Unmod)	AM	Tuning gang fully open	Across speaker voice coil	A12, A13, A14, A15	Adjust for maximum output.
8.		Loop	1500KC	"	1500KC	"	A16, A17	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

TUNER ALIGNMENT INSTRUCTIONS LOCATED ON PAGES 6 & 8

FIG.1



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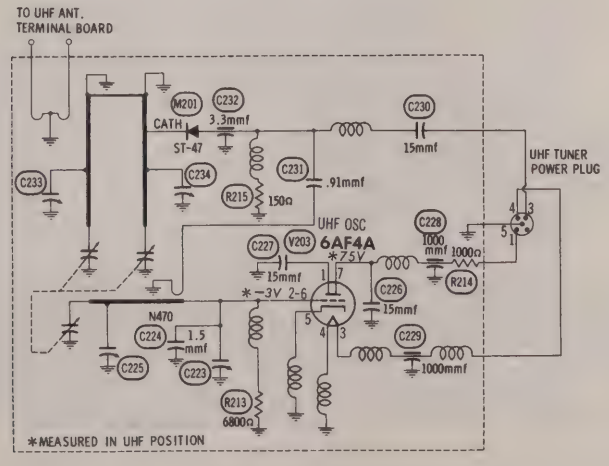
VHF TUNER WITH UHF PROVISIONS CL5662



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UHF TUNER CL5825

TUNER CL5662–CL5825
PARTS LIST AND DESCRIPTIONS
TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V201	RF Amp.	6BK7B	
V202	Mixer-Osc.	6U8	

ITEM No.	USE	TYPE	NOTES
V203	UHF Osc.	6AF4A	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	OLYMPIC PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C201	10				TCZ-10				5%
C202	18			DI 18	DD-180	L10Q18	UC-5418	5GA-Q18	
C203	2.7								±.5mmf
C204	1000			EF-001	MFT-1000			503C-DI	
C205	1000			EF-001	MFT-1000			503C-DI	
C206	15			BPD-000015	DD-150	L10Q15	UC-5415	5GA-Q15	
C207	15			BPD-000015	DD-150	L10Q15	UC-5415	5GA-Q15	
C208	1.2								±.5mmf
C209	1000			BPD-001	DD-102	BYA6DI	DC521	5HK-DI	
C210	1000			EF-001	MFT-1000			503C-DI	
C211	1000			EF-001	MFT-1000			503C-DI	
C212	1.5								N1000
C213	10			BPD-00001	DD-100	L10Q1	UC-541	5GA-Q1	
C214	47			BPD-000047	DD-470	L10Q47	UC-5447	5GA-Q47	
C215									
C216	1000			EF-001	MFT-1000			503C-DI	
C217	1000			EF-001	MFT-1000			503C-DI	
C218	1000			EF-001	MFT-1000			503C-DI	
C219	1.5								
C220	1000			EF-001	MFT-1000			503C-DI	
C221	1000			EF-001	MFT-1000			503C-DI	
C222	1000			EF-001	MFT-1000			503C-DI	
C223									
C224	1.5								N470
C225									
C226	15								
C227	15								
C228	1000			EF-001	MFT-1000			503C-DI	
C229	1000			EF-001	MFT-1000			503C-DI	
C230	15			BPD-000015	DD-150	L10Q15	UC-5415	5GA-Q15	
C231	.91								
C232	3.3								
C233									
C234									

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		OLYMPIC PART No.	NOTES
	OHMS	WATT		
R201	5600Ω			
R202	1meg			
R203	750K			
R204	15K			
R205	120K			
R206	470K			
R207	6800Ω			
R208	1800Ω			

ITEM No.	RATING		OLYMPIC PART No.	NOTES
	OHMS	WATT		
R209	15K			
R210	2700Ω	1		
R211	2700Ω			
R212	150K			
R213	6800Ω			
R214	1000Ω			
R215	150Ω			

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		OLYMPIC PART No.	CBS PART No.	SYLVANIA PART No.	
M201	ST-47		1N82A	1N82A	UHF Mixer (Clip-in)

TUNER ALIGNMENT INSTRUCTIONS

TUNER #CL5662

VHF OSCILLATOR ALIGNMENT

Set the fine tuning to the center of its range (flat of fine tuning shaft is at right angles to top of tuner). Set the Channel Selector to the highest high band channel (13-7) operating in the area. Adjust the high band oscillator adjustment slug (A201) for best picture and sound. Switch Channel Selector to the highest low band channel (6-2) operating in the area and adjust the low band oscillator adjustment(A202) for best picture and sound. Recheck high band adjustment.

VHF RF AND MIXER ALIGNMENT

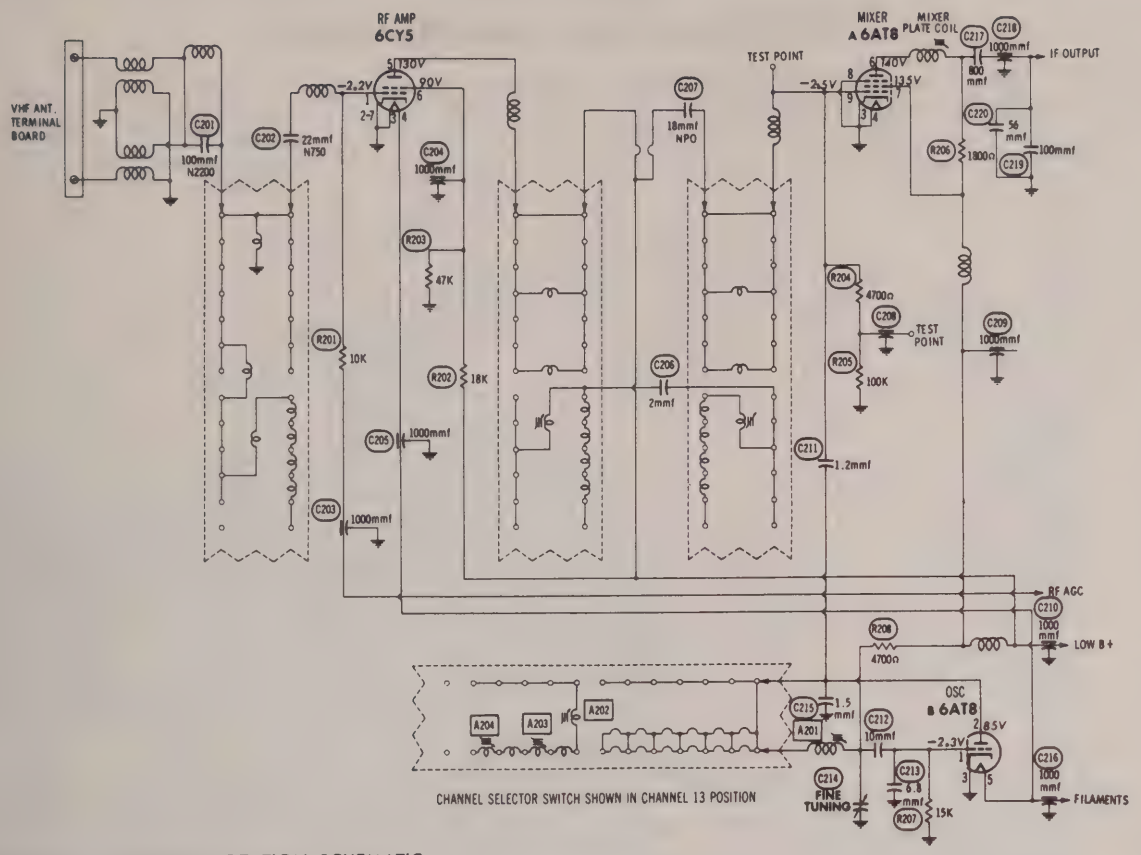
This portion of the receiver has been properly aligned at the factory and is very stable. Alignment of this portion should not be required in the field.

UHF TUNER DIAL ALIGNMENT

Turn the VHF tuner to UHF position and turn the fine tuning (UHF tuning) fully counterclockwise. Remove the VHF Channel Selector and Fine Tuning knobs and the UHF dial, but do not turn shaft. Replace the UHF dial so that the number 80 will be visible thru the UHF window in the VHF Channel Selector knob. Replace the Fine Tuning and VHF Channel Selector knobs.

UHF TUNER ALIGNMENT

This portion of the receiver has been properly aligned at the factory and is very stable. Alignment of this portion should not be required in the field.



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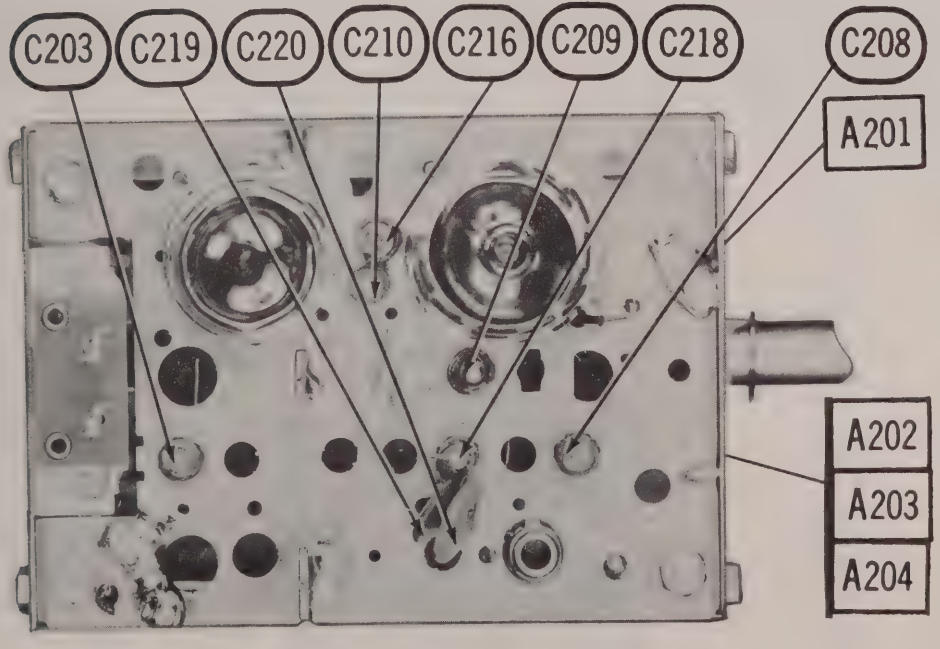
VHF TUNER CL5659



TUNER CL5659 - TOP VIEW

TUNER CL 5659
PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V201	RF Amp.	6CY5	

ITEM No.	USE	TYPE	NOTES
V202	Mixer-Osc.	6AT8A	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	OLYMPIC PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C201	100								N2200
C202	22			N750-DI 22	DTN-22	C10Q22U		5TCU-Q22	N750
C203									
C204									
C205									
C206	2					C10V2C			
C207	18				TCZ-18	C10Q18C			NPO
C208									
C209									
C210									
C211	1.2								
C212	10			BPD-00001	DD-100	L10Q1	UC-541	5GA-Q1	
C213	6.8			NPO-DI 6.8	DTZ-6R8	C10V68C	ZT-5568	5TCCB-V68	
C214									
C215	1.5								N330
C216									
C217	800			BPD-0008	DD-801	L10T8		5TA-T8	
C218									
C219	100			BPD-0001	DD-101	L10T1	UC-531	5GA-T1	
C220	56	2000							10%

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		OLYMPIC PART No.	NOTES
	OHMS	WATT		
R201	10K			
R202	18K			
R203	47K			
R204	4700Ω			

ITEM No.	RATING		OLYMPIC PART No.	NOTES
	OHMS	WATT		
R205	100K			
R206	1800Ω			
R207	15K			
R208	4700Ω			

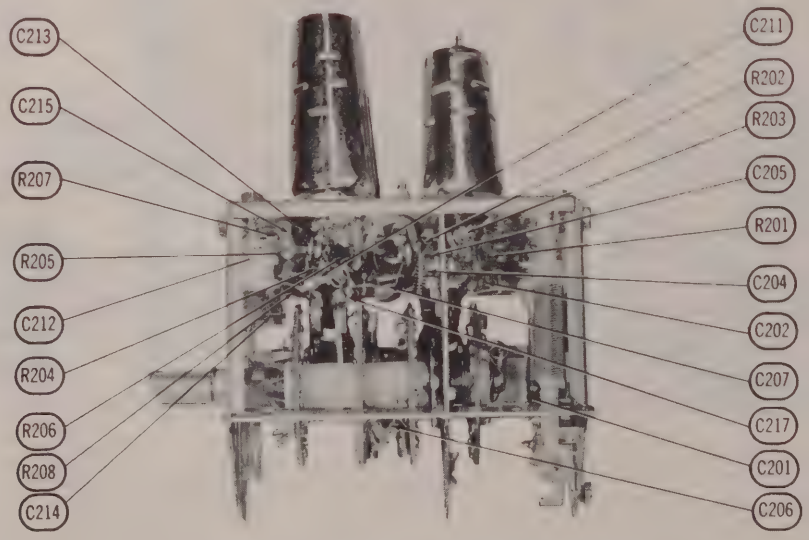
ALIGNMENT INSTRUCTIONS

VHF OSCILLATOR ALIGNMENT

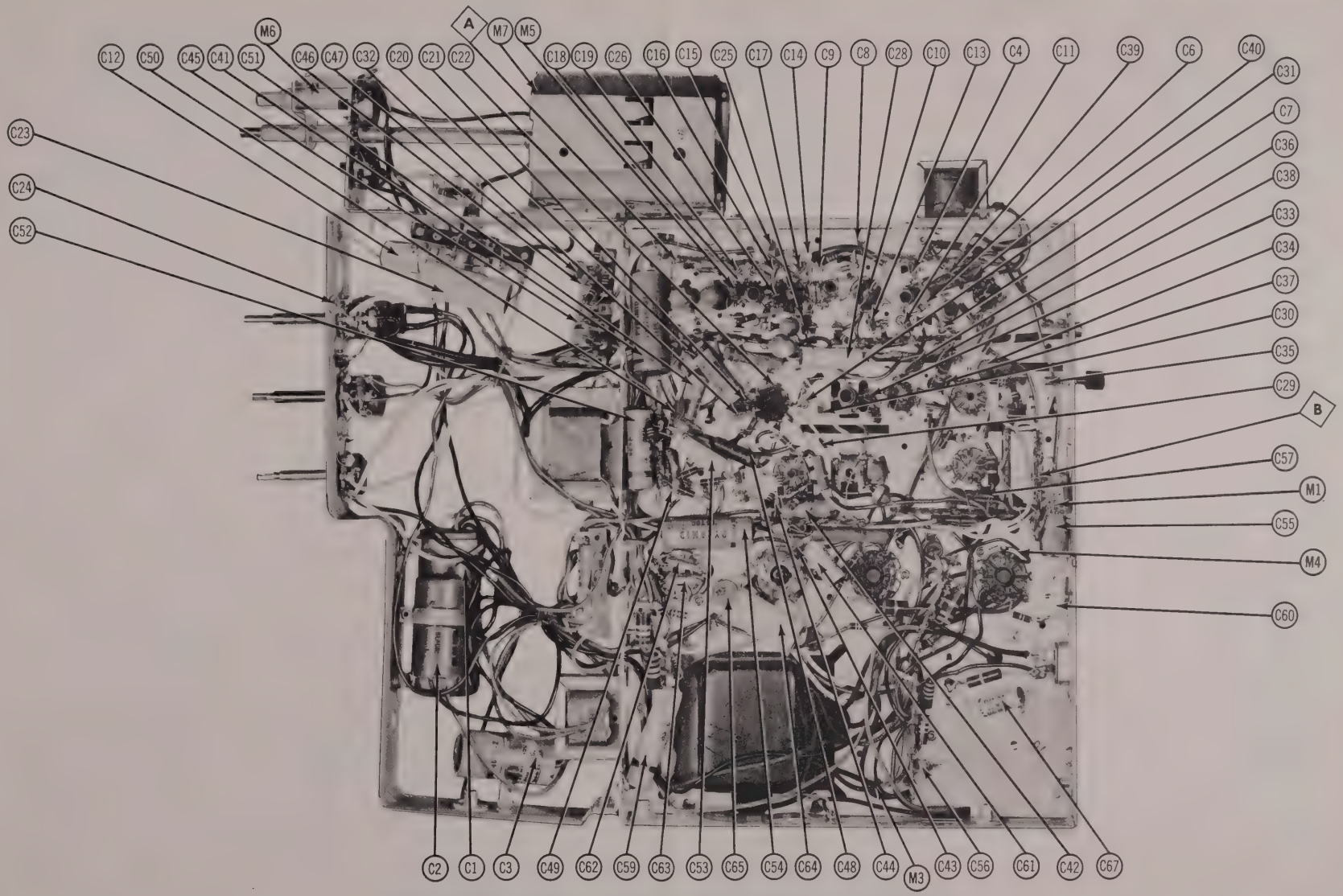
Channel 13 oscillator adjustment slug (A201) is also used for adjusting the other high band (12 thru 7) channels. Channel 6 oscillator adjustment slug (A202) is also adjusted for channel 5. Channel 4 oscillator adjustment (A203) is also adjusted for channel 3. Channel 2 oscillator slug (A204) is used for channel 2 only.

Turn the set on and tune in the highest high band channel and adjust controls for normal operation. Set Fine Tuning to the center of its range. Adjust A201 for best picture and sound. Switch to next high band channel. If necessary to adjust, do so by bending coil loop appearing at the hole to left of tuner shaft for best picture and sound.

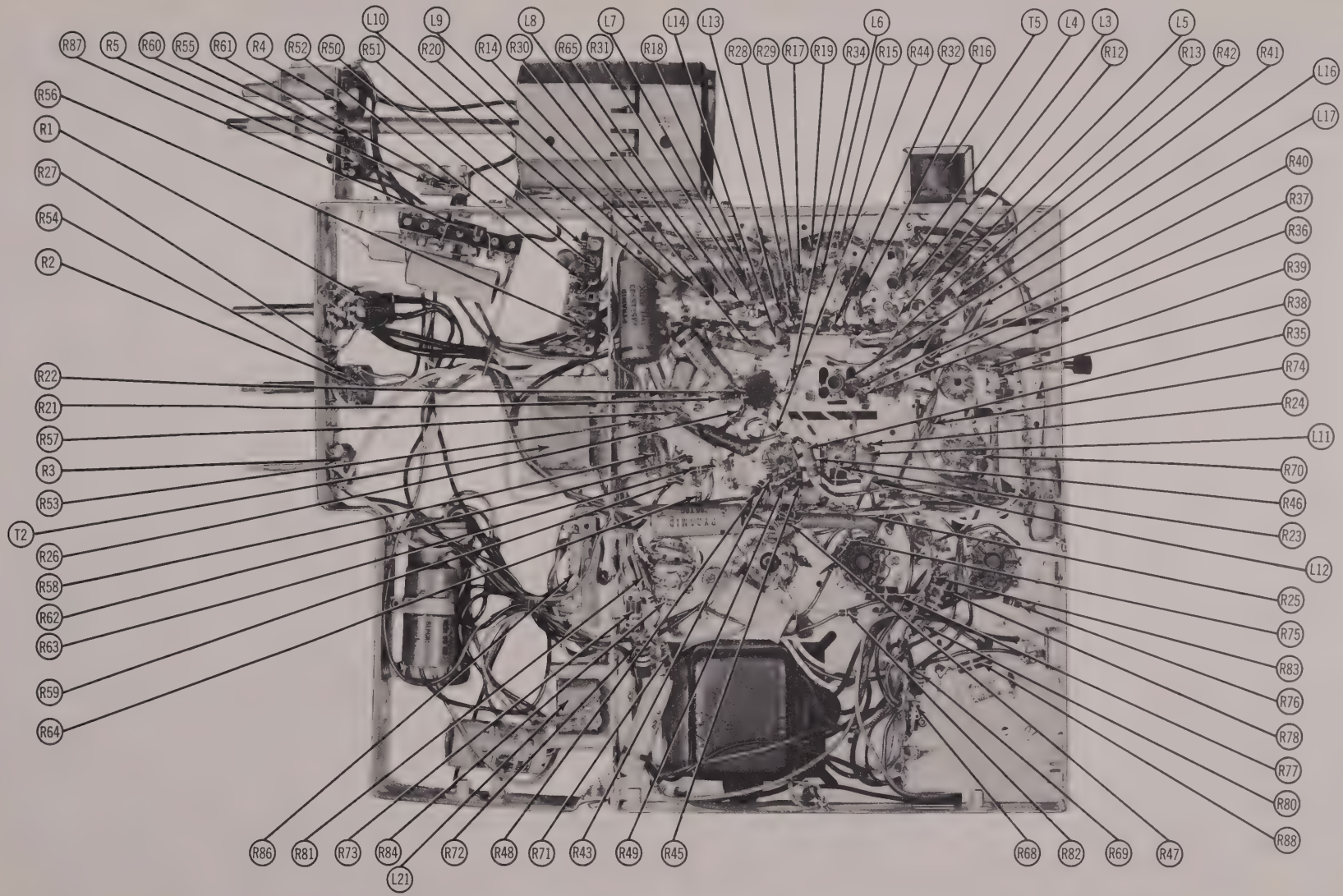
Switch Channel Selector to the highest low band channel (6 thru 2) operating in the area. Adjust proper slug for best picture and sound. If channel 5 or 3 need adjusting, it will be necessary to switch to the next higher channel, adjust slug SLIGHTLY, then switch back to the channel needing adjustment and check picture. Repeat until proper results are obtained. Repeat procedure until all channels operating in the area have been properly adjusted.



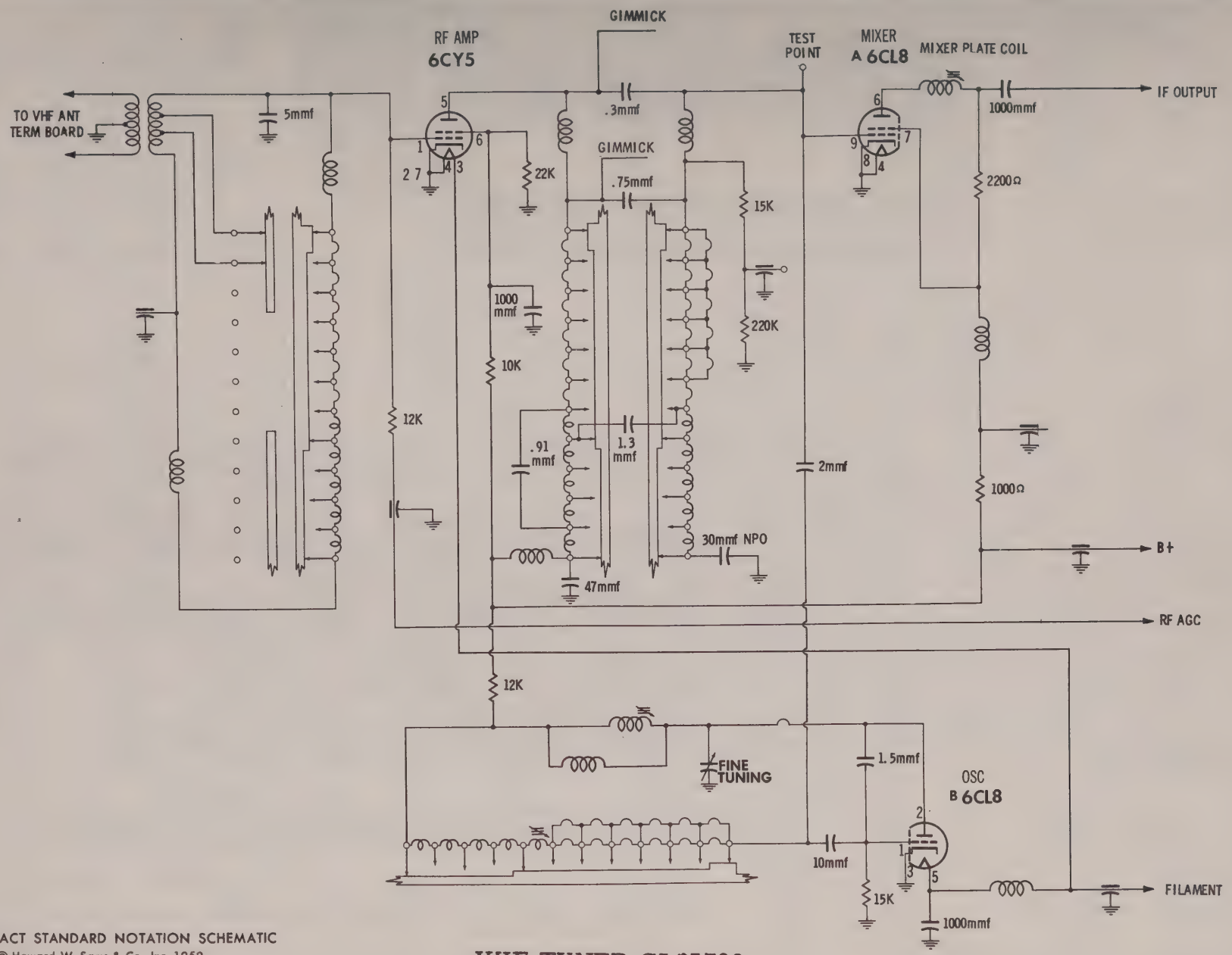
TUNER CL5659 - SIDE VIEW



CHASSIS BOTTOM VIEW-CAPACITOR AND ALIGNMENT IDENTIFICATION



CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION



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VHF TUNER CL25796

OLYMPIC CHASSIS HA, HAU, HB, HBU, HD, HDU, HF, HFU, HH, HHU, 134

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	1st Video IF Amp.	6BZ6	
V2	2nd Video IF Amp. - Video Output	6CU6	
V3	Video Output-Sound IF Amp.	6AW8	
V4	Audio Det.	6DT6	
V5	Audio Output	6CU5	6CA5 *
V6	Noise Cancellor-Sync Sep.	12AX7	6AV8 ①

* Alternate. ① Used in Ch. HA, HAU.

ITEM No.	USE	TYPE	NOTES
V7	Vert. Mult.-Vert. Output	6CM7	
V8	Horiz. Mult.	6CG7	
V9	Horiz. Output	6DQ6	6CU6 *
V10	Damper	6AX4GT	
V11	HV Rect.	1B3GT	
V12	LV Rect.	5U4GB	

PICTURE TUBE

ITEM No.	REPLACEMENT DATA				NOTES
	OLYMPIC PART No	GENERAL ELECTRIC PART No.	RCA PART No	SYLVANIA PART No.	
V13	21CBP4A	21BTP4 ①	21CBP4 ③	21CBP4/ 21CBP4A ③	① "Aluminized". Use Ion Trap. ② "Silverama" ③ ④ "Silver Screen 85"
	24AEP4		24AEP4 ②	24AEP4 ③	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT	OLYMPIC PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	60	350	CO-35794	PRA-450	BBRT0235				TVA8-3626 *
B	60	350			BR6025				
C	60	250							
C2	50	250	CO-3068-3	PRA250V50	BR5035	TC59	TD-50-450	MT-4550	TVA-1718
C3	10	450	CO-4022-2	PRA450V10	BR1045	TC72	TD-10-450	MT-4510	TVA-1705

* Not normally in distributors stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	OLYMPIC PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C4	1000		CCD102M	BPD-001	DD-102	BYA10DM	B-210	5HK-DI	
C5	15		CCD150K	NPO-DI 15	DTZ-15	C10QI5C	CNO-415	5TCC-QI5S 10% *	NPO 10%
C6	.47		CO35934						①
C7	6.8		CO4617	NPO-DI 6.8	DTZ-6R8	C10V68C	CNO-568	5TCCB-V68S 10% *	10% ①
C8	1000		CCD102M	BPD-001	DD-102	BYA10DM	B-210	5HK-DI	
C9	470		CCD471K	DI-470	MD-471		JL-347	5GA-T47S 10% *	10%
C10	1000		CCD102M	BPD-001	DD-102	BYA10DM	B-210	5HK-DI	
C11	1000		CCD102M	BPD-001	DD-102	BYA10DM	B-210	5HK-DI	
C12	.22	200	CO-H-2234	P388N-22		CUB2P22	GEM-2022	2TM-P22	
C13	1000		CCD102M	BPD-001	DD-102		JL-210	5GA-D1S 10% *	10%
C14	1000		CCD102K	BPD-001	DD-102	BYA10DM	B-210	5HK-DI	
C15	1000		CCD102M	BPD-001	DD-102	BYA10DM	B-210	5HK-DI	
C16	1000		CCD102K	BPD-001	DD-102	BYA10DM	B-210	5HK-DI	
C17	1000		CCD102M	BPD-001	DD-102	BYA10DM	B-210	5HK-DI	
C18	18		CO4838		TCZ-18	C10QI8C	CNO-418	5TCC-QI8S 10% *	10%
C19	4.7		CO3081	NPO-SI 4.7	TCZ-4R7	CUA5V4C	Z7-5547	5TCCB-V47	
C20	.047	400	CO-H-4473	P488N-047		CUB4S47	GEM-4147	4TM-S47	
C21	5000		CCD502K	BPD-005	DD-502	BYA10D5	B-250	5HK-D5	
C22	5000		CCD502K	BPD-005	DD-502	BYA10D5	B-250	5HK-D5	
C23	.22	400	CO-H-4224	P488N-22		CUB4P22	GEM-4022	4TM-P22	
C24	33		CO25799	NPO-DI 33	DTZ-33	C10Q33C	CNO-433	5TCC-Q33S 10% *	10%
C25	15		CO3801	NPO-DI 15	DTZ-15	C10QI5C	CNO-415	5TCC-QI5S 10% *	10%
C26	1000		CCD102M	BPD-001	DD-102	BYA10DM	B-210	5HK-DI	
C27	.1	400	CO-H-4104	P488N-1		CUB2P1	GEM-401	2TM-P1	
C28	.047	400	CO-H-4473	P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	
C29	10		CCD100K	NPO-DI 10	DTZ-10	C10QIC	CNO-410	5TCC-QI0 10% *	NPO 10%
C30	330		CCD331M	BPD-00033	DD-331	L10T33		5GA-T33	
C31	6.8		CO4617	NPO-DI 6.8	DTZ-6R8	C10V68C	CNO-568	5TCCB-V68S 10% *	NPO 10%
C32	5000		CCD502K	BPD-005	DD-502	BYA10D5	B-250	5HK-D5	
C33	1000		CCD102M	DI-1000	DD-102		JL-210	5GA-D1S 10% *	10%
C34	50000	50	CO4785	P388N-05	DDA-503	CUB3S5	GEM-515	6TM-S5	
C35	.7-3		CO25586		829-3				N750 a. 5mmf ②
C36	5000		CCD502K	BPD-005	DD-502	BYA10D5	B-250	5HK-D5	
C37	1000		CCD102M	DI-1000	DD-102		JL-210	5GA-D1S 10% *	10%
C38	5000		CCD502M	BPD-005	DD-502	BYA10D5	B-250	5HK-D5	
C39	5000		CCD502K	BPD-005	DD-502	BYA10D5	B-250	5HK-D5	
C40	.0047	600	CO-O-4472K	P688N-0047		CUB5D47	GEM-16247	6TM-D472 10% *	10%
C41	.47	300	CO-H-2474	P288N-47		CUB2P47	GEM-2047	2TM-P47	
C42	.047	400	CO-H-4473	P488N-047		CUB4S47	GEM-4147	4TM-S47	
C43	2000		CCD202M	BPD-002	DD-202	BYA10D2	B-220	5HK-D2	
C44	470		CCD471M	DI-470	MD-471		JL-347	5GA-T47S 10% *	10%
C45	.15	600	CO-H-4154	P488N-15		CUB4P15	GEM-4015	4TM-P15	
C46	820		CCD821K				JL-382	5GA-T82S 10% *	10% ②
C47	2000		CCD202M	BPD-002	DD-202	BYA10D2	B-220	5HK-D2	③
C48	.0047	500	CO-O-4472K	P668N-0047	D6-472	CUB6D47	GEM-16247	6TM-D47	
C49	.0047	600	CO-O-4472K	P688N-0047	D6-472	CUB6D47	GEM-16247	6TM-D47	
C50	10000		CCD103M	BPD-01	DD-103	BYA10S1		B-110	5HK-S1
C51	.056	600	CO-O-4333						6TM-S33S 10% * 10%
C52	.1	600	CO-H-4104	P488N-1		CUB4P1	GEM-401	4TM-P1	
C53	.01	1000	CO-O-X103	P1088N-01		CUB10S1	GEM-1011	10TM-S1	
C54	.15	400	CO-H-4154	P488N-15		CUB4S15	GEM-4015	4TM-S15	
C55	.1	300	CO-H-2104	P288N-1		CUB2P1	GEM-201	2TM-P1	
C56	470	300	CO6467	DI-470	MD-471		JL-347	5GA-T47S 10% *	10%
C57	.001	600	CO-O-6102K					GEM-1621	6TM-D15 10% * 10%
C58	1800		CO6468	1464-0039		1R5D39		MS-239	10%
C59	.1	600	CO-H-6104	P688N-1		CUB2P1		GEM-601	2TM-P1
C60	110-580		CT3526						
C61	.047	400	CO-H-4473	P488N-047		CUB4S47	GEM-4147	4TM-S47	
C62	150	3000	CO3830						N1500 5% ④
C63	47	3000				EVA30Q47	3DY-447	30GAB-Q47E 10%	10% ⑤
C64	.22	400	CO-H-4224	P488N-22		CUB4P22	GEM-4022	4TM-P22	⑥
C65	10000		CCD103M	BPD-01	DD-103	BYA10S1		B-110	5HK-S1 ⑦
C66	68	3000	CO4530				3DY-468	30GAB-Q68S10% *	10%
C67	.01	600	CO-H-6103	P688N-01	D6-103	CUB6S1		GEM-611	6TM-S1

* Not normally in distributors stock. Available thru distributor on order to manufacturer.
① Not used in Ch. HA, HAU.
② Chassis stamped Run 5 and higher use 5mmf N750 across L18 to replace C35.
③ Part of Component Combination (Part #PC36048) in chassis stamped Run 5 and higher.
④ Chassis stamped Run 4 and higher use 100mmf ⑤ 3000V in this application.
⑥ Not used in chassis stamped Run 2 and higher.
⑦ Chassis stamped Run 4 and higher use .1mfd ⑧ 400V in this application (Part #CO-H-4104).
⑨ Some versions may use 1000mmf in this application (Part #CCD102M).

CONTROLS

ITEM No	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	OLYMPIC PART No	CENTRALAB PART No.	CLAROSTAT PART No	IRC PART No.	MALLORY PART No.	
R1A	15K	½	PT25788				▲ UE3919-S	Contrast, Note 1
B	1.25meg	½						Volume, Note 1
C	Switch							
R2A	1meg	½	PT5704	V1-81	RTV-669	†(Q)-966	†† UE3593	Horiz. Hold
B	2meg	½		R2-67	Not Req.			Vert. Hold
R3A	1meg	½	PT5702	B-69	A47-1meg-S	Qil-137	UI58	Brightness, Note 2
B	Shaft			Not Req.	KS8-3	Not Req.	Not Req.	
R4A	500K	½	PT25790	B-59	B47-500K-S	Bil-133	PTA25L	Vert. Linearity
B	Shaft			Not Req.	Not Req.	TM-1	Not Req.	
R5A	2.5meg	½	PT5008-1	AB-83	B47-2.5meg-S	Qil-239	TA265L	Height
B	Shaft			AK-1	Not Req.	TQ	Not Req.	

Note 1. Chassis HA, HAU use alternate part #PT25790.
Note 2. Chassis HD, HDU, HH, HHU use a dual Tone-Brightness control (Part #PT25736).
▲ "STA-LOC" Equivalent: FA153L, RUP18L, CS1500.
† "Concentrikit" Equivalent: K-6 Kit, Base Element & Shaft: Bil-137, P17-1i8 (Panel) Bil-139, R1-130 (Rear)
†† "STA-LOC" Equivalent: FA16L, CS1500, RU26L, IS2000.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		OLYMPIC PART No.	NOTES
	OHMS	WATT		
R6	470Ω		REB471K	
R7	470Ω		REB471K	
R8	180Ω		REB181K	
R9	180Ω		REB181K	
R10	10Ω		REB100K	
R11	10Ω		REB100K	
R12	33K		REB233K	Note 1
R13	1000Ω		REB102M	
R14	1meg		REB105K	
R15	330Ω		REB331M	
R16	47Ω		REB470K	
R17	33K		REB233K	
R18	330Ω		REB331M	
R19	180Ω		REB181K	
R20	8200Ω		REB832K	
R21	1.5meg		REB155K	
R22	1meg		REB105K	
R23	10K		REB103K	Note 2
R24	10K		REB103K	
R25	6800Ω	4	REB683K	Note 3
R26	100Ω		REB101K	
R27	470Ω		REB471K	Note 4
R28	10K		REB103K	
R29	15K		REB153K	Note 5
R30	5600Ω	2	REB562K	
R31	100Ω		REB101K	
R32	100K		REB104K	
R33	220K		REB224K	Note 6
R34	1meg		REB105K	
R35	2KK	1	REC223K	
R36	47K		REC473K	
R37	270K	1	REC274K	
R38	150K		REB154K	
R39	560K		REB564K	
R40	1000Ω		REB102M	
R41	1meg		REB105K	
R42	1meg		REB105K	
R43	330K		REB334K	Note 7
R44	220K		REB224K	Note 7
R45	10meg		REB106M	Note 7
R46	100K		REB104K	Note 7
R47	2.2meg		REB225M	

ITEM No.	RATING		OLYMPIC PART No.	NOTES
	OHMS	WATT		
R48	470K		REB474M	
R49	100K		REB104K	Note 8
R50	68K		REB683K	Note 9
R51	68K		REB683K	Note 9
R52	100K		REB104K	Note 9
R53	27K		REB273K	
R54	1.5meg		REB155M	
R55	1.5meg		REB155K	
R56	1.5meg		REB155K	
R57	12K		REB123K	
R58	1meg		REB105K	
R59	150Ω		REB151M	
R60	470K		REB474K	
R61	220K		REB224M	
R62	10meg		REB106M	
R63	150K		REB154K	
R64	100Ω		REB101M	
R65	22000		REB223K	
R66	560Ω		REB561K	
R67	560Ω		REB561K	
R68	330K	1	REC334K	
R69	330K		REC334K	
R70	6800Ω	1	REC682K	
R71	470K		REB474K	
R72	18K	1	REC183K	Note 10
R73	18K	1	REC183K	Note 10
R74	680Ω		REB681K	
R75	47Ω		REB470K	
R76	10K		REB103K	
R77	5600Ω	2	RED562K	
R78	3300Ω	2	RED332K	
R79	33Ω	1	REC330M	Note 11
R80	100K		REB104K	
R81	1000Ω	2	RED102M	
R82	150K		REB154K	
R83	47K	1	REC473M	
R84	47000		REB473K	
R85	3.3Ω	1	RE449	
R86	390Ω	2	RED39K	
R87	33Ω	1	REC330M	
R88	100K	1	REB104M	Note 8
R89	100Ω Cold		RE25797	

Note 1. Ch. HA, HAU use 15K in this application (Part #REB153K).
Note 2. Some versions use 22K in this application (Part #REB223K).
Note 3. Chassis stamped Run 4 and higher use 47000 4W in this application (Part #RH5636).
Note 4. Chassis stamped Run 2 uses 100Ω in this application (Part #REB101M).
Note 5. Chassis stamped Run 2 and higher use 150K in this application (Part #REB154K).
Note 6. Chassis stamped Run 1A and higher use 150K in this application (Part #REB154K).
Note 7. Not used in Ch. HA, HAU.
Note 8. Ch. HA, HAU use 470K in this application (Part #REB474K)
Note 9. Chassis stamped Run 5 and higher use Component Combination (Part #PC36048) in this application.
Note 10. Some versions may use 36K 2W (Part #REC2S900) to replace R72 and R73.
Chassis stamped Run 5 and higher use a single 3300Ω (Part #REB332K).
Note 11. Chassis stamped Run 4 and higher use 150 ½W in this application (Part #REB150M).

COILS (RF-IF)

ITEM No.	REPLACEMENT DATA						NOTES
	OLYMPIC PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.		
L2	RF Choke	CL25476					4 Turns of Wire on 1meg resistor ①
L3	47.25MC Trap	CL25545					①
L4	RF Choke	CL1535	19-3036	TV-180	6176	VP-1	36 Microhenries
L5	1st Video IF	CL4753	17-4523			VF-4	
L6	47.25MC Trap	CL4753				VF-4	①
L7	2nd Video IF	CL4611	17-4522	TV-130	6219	VF-3	
L8	3rd Video IF	CL4791	17-4523	TV-130	6219	VF-3	
L8	Resonant Choke	CK4225					1.7 Microhenries
L9	Series Peaking Coil	CL2388	19-3180 *	TV-184 *	6180 *	VP-8 *	180 Microhenries, wound on 12K resistor
L10	Shunt Peaking Coil	CL25919	19-1041	BC-814	4064		1500 Microhenries ②
L11	Series Peaking Coil	CL25787	19-3135				135 Microhenries
L12	Shunt Peaking Coil	CL25786	19-3250	TV-185	6181	VP-6	340 Microhenries
L13	Series Peaking Coil	CL25787	19-3125				125 Microhenries
L14	Shunt Peaking Coil	CL1537	19-4180	TV-183	6179	VP-5 ▲	180 Microhenries, wound on 39K resistor
L15	1st Sound IF	CL25518					
L16	2nd Sound IF	CL4021	17-3412				Tapped @ 1.5Ω @ .5Ω
L17	RF Choke	CK4415	19-1004	BC-565	4610		6.8 Microhenries
L18	Quadrature Coil	CL3603-1			1481	SD-5	
L19	RF Choke	CK4415	19-1004	BC-565	4610		6.8 Microhenries

* Parallel with 12K resistor.
▲ Parallel with 39K resistor.
① Not used in Ch. HA, HAU.
② Ch. HA, HAU Run 2 & higher use 500 Microhenries in this application (Part #CL3614).

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES.		REPLACEMENT DATA						NOTES
	PRI.	SEC.	OLYMPIC PART No	Meissner PART No	Merit PART No	Miller PART No	Ram PART No.	Thordarson PART No.	
L20	64Ω		CL5464-1						

FILTER CHOKE

ITEM No	RATINGS			REPLACEMENT DATA						
	CURRENT (Measured)	DC RES	INDUCTANCE @ CURRENT (Ω)	OLYMPIC PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No
L21	.210A	63Ω	.7 Hy.	CK4047	CS030 ①			C-2325 ①	26C43 ①	C-24X ①

① Drill new mounting hole.

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA						
	PRI.	SEC. 1	SEC. 2	OLYMPIC PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No
T1	117V @ 1.45A	640VCT @ .210A	5V @ 3A	TR4007-2				P-8172		R-69BC①
	SEC. 3	SEC. 4	SEC. 5							
	6.3V @ 7.8A									

① Drill new mounting hole.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA							
		OLYMPIC PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Rogers PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No
T3	Vert. Output	TR-3571	Z1900 ①						A-109X
T3	Yoke-Horiz. (58.4MH (90°)-Vert. (39MH)	CL-3600-4	DF507 ②③	MDF-92 ②③	P0F19/43 ②③	PCM2045 ②③	DY-16A ②③	Y-16 ②③	Y-41 ④ NW3 ③ YC-1
	Rear Cover & Centering Device	PP-5640							
	Yoke Clamp	SP-5672							CL-1
T4	Horiz. Output	TR-3599-5D		X161 *					D-120 *
	Alt. Horiz. Output	TR-3599-5		X161 *					D-120 *

① Use 15 to 1 turns ratio.
② Use original horizontal yoke damping network, U necessary. Use original rear cover and centering device.
③ Connect same as original.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

ORIGINAL TERMINAL CONNECTIONS	Halldorson Replacement Connections	Merit Replacement Connections	Ram Replacement Connections	Rogers Replacement Connections	Stancor Replacement Connections	Thordarson Replacement Connections	Triad Replacement Connections
9			9				9
8			8				8
6			6				6
3			4				3
2			3 & 2				2
1							

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	OLYMPIC PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No
T5	2400Ω	3-4Ω	TR2766-1	Z1101	A-3025	AU-605	A-3332	24S53	S-12X

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	OLYMPIC PART No.	QUAM PART No.	
SP1	6"	PM	3-4Ω	SK4343 ①	4A07	① Used in Models CB136, U, CB137, U, CB140, U, CF410, U, CF411, U, TA130, U, TB131, U. Two used in Models KH148, U. Three used in Models KH148, U, KH149, U, KH416, U, KH417, U.
	8"	PM	3-4Ω	SK1905-2 ②	8A31	② Used in Models CA135, U, CB136, U, CB140, U, CF410, U.
	8"	PM	3-4Ω	SK1788-2 ③	8A07	③ Two used in Models KA145, U.
	6" x 9"	PM		SK3738 ④		④ Used in Models CB137, U, CF411, U, KH148, U, KH149, U, KH416, U, KH417, U

RECTIFIERS

ITEM No.	RATING	REPLACEMENT DATA				NOTES
	CURRENT (Measured)	OLYMPIC PART No.	FEDERAL PART No.	GENERAL ELECTRIC PART No.	INTERNATIONAL PART No	SARKES TARZIAN PART No.	
M1		RF5465 ①	KH15 ①		SD-R4 ②		① Selenium Type. ② Silicon Type. Two used.

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			OLYMPIC PART No		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M2	C	3/8A 250V	FU4345	FH4344	332.375 (C-3/8A-250V)	346002	C 3/8	HC 3/10 to 1/2
M3	3½" Length of #26 Wire							
M4	3½" Length of #26 Wire							

OLYMPIC CHASSIS HA, HAU, HB, HBU, HD, HDU, HF, HFU, HH, HHU, 134

FOLDER 2

PARTS LIST AND DESCRIPTIONS (Continued)

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		OLYMPIC PART No.	CBS PART No.	SYLVANIA PART No.	
M5	1N64 *		1N64	1N295	Video Detector (Pigtail) * Some versions may use a 1N60.

MISCELLANEOUS

ITEM No.	PART NAME	OLYMPIC PART No.	NOTES
M6	Lamp	BU187	#47, Not used in Ch. HA, HAU
M7	Tuner	CL5659	VHF, Ch. HB, HD, HF, HH
	Tuner	CL25796	VHF, Ch. HA
	Tuner	CL5662	UHF-VHF, Ch. HAU, HBU, HDU, HFU, HHU
	Tuner	CL5220-1	UHF-VHF, Ch. HAU (Early Production)
M8	Switch	SW2956-1	Local-Distance, DPDT (Slide Type)

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Safety Glass	PP3656	Models TA130, U, CA135, U, KA145, U
Safety Glass	PP3656-1	Models TB131, U, CB136, U, CB137, U, KB146, U, CB140, U, KD148, U, KB149, U
Safety Glass	PP3939-1	Models CF410, U, CF411, U
Mask	PP3646-1	Models TA130, U, CA135, U, KA145, U
Mask	PP3646-2	Models TB131, U, CB136, U, CB137, U, KB146, U, CB140, U, KD148, U, KD149, U
Mask	PP3938	Models CF410, U, CF411, U, KH416, U, KH417, U
Knob	KN25770	VHF Channel Selector
Knob	KN25771	UHF-VHF Channel Selector, Used with Models having CL5662 Tuner
Knob	KN5491	UHF-VHF Channel Selector, Used with Models having CL5220-1 Tuner
Knob	KN5896	Fine Tuning
Knob	KN5236	Vernier Tuning, Used with Models having CL5220-1 Tuner
Knob	KN5185	Calibrated Vernier Dial, Used with Models having CL5220-1 Tuner
UHF Dial	KN5898	Used with UHF Models having CL5662 Tuner
Knob	KN25773	Contrast, Horiz. Hold; Models KD148, U, KD149, U, KH416, U, KH417, U use as Brightness also
Knob	KN25777	Brightness, Used on all Models except Models KD148, U, KD149, U, KH416, U, KH417, U
Knob	KN25775	Vert. Hold, Volume-On-Off, Used on all Models, except 2 used on Models TA130, U, CA135, U, KA145, U
Knob	KN25776	3-D Tone, Models KD148, U, KD149, U, KH416, U, KH417, U
Knob	KN25873	Radio Tuning, Models KD148, U, KD149, U
Knob	KN25875	Radio Tone, On-Off, Models KD148, U, KD149, U, KH416, U, KH417, U
Knob	KN25872	Radio Volume, Models KD148, U, KD149, U, KH416, U, KH417, U
Knob	KN25874	AM-Phono-TV, Models KD148, U, KD149, U, KH416, U, KH417, U
Knob	KN25868	AM-Phono-TV, Models KA145, U
Knob	KN25870	AM-Phono-TV, Models KB146, U
Pushbutton	KN25774	
Cabinet	CA25801	Models TA130, U
Cabinet	CA25803	Models CA135, U
Cabinet	CA25804	Models CB137, U
Cabinet	CA25805	Models CB140, U
Cabinet	CA25808	Models KA145, U
Cabinet	CA25809	Models KB146, U
Cabinet	CA25810	Models KD148, U
Cabinet	CA25811	Models KD149, U
Cabinet	CA25813	Models CF410, U
Cabinet	CA25814	Models CF411, U
Cabinet	CA25816	Models KH416, U
Cabinet	CA25817	Models KH417, U

WIRING DATA

High Voltage Lead	Use BELDEN No.	8869
Shielded Hook-up Wire	Use BELDEN No.	8885 (Single Conductor) 8738 (Two Conductor)
General-use Unshielded Hook-up Wire	Use BELDEN No.	8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord (Interlock Type)	Use BELDEN No.	8874
300Ω Tuner Input Lead	Use BELDEN No.	8225
300Ω Antenna Lead-in	Use BELDEN No.	8230 or 8275
Antenna Rotor Cable	Use BELDEN No.	8464 (Flat) or 8484 (Round) - 4 Conductor 8485 (Round) - 5 Conductor 8488 (Round) - 8 Conductor

UHF-VHF TUNER CL5220-1

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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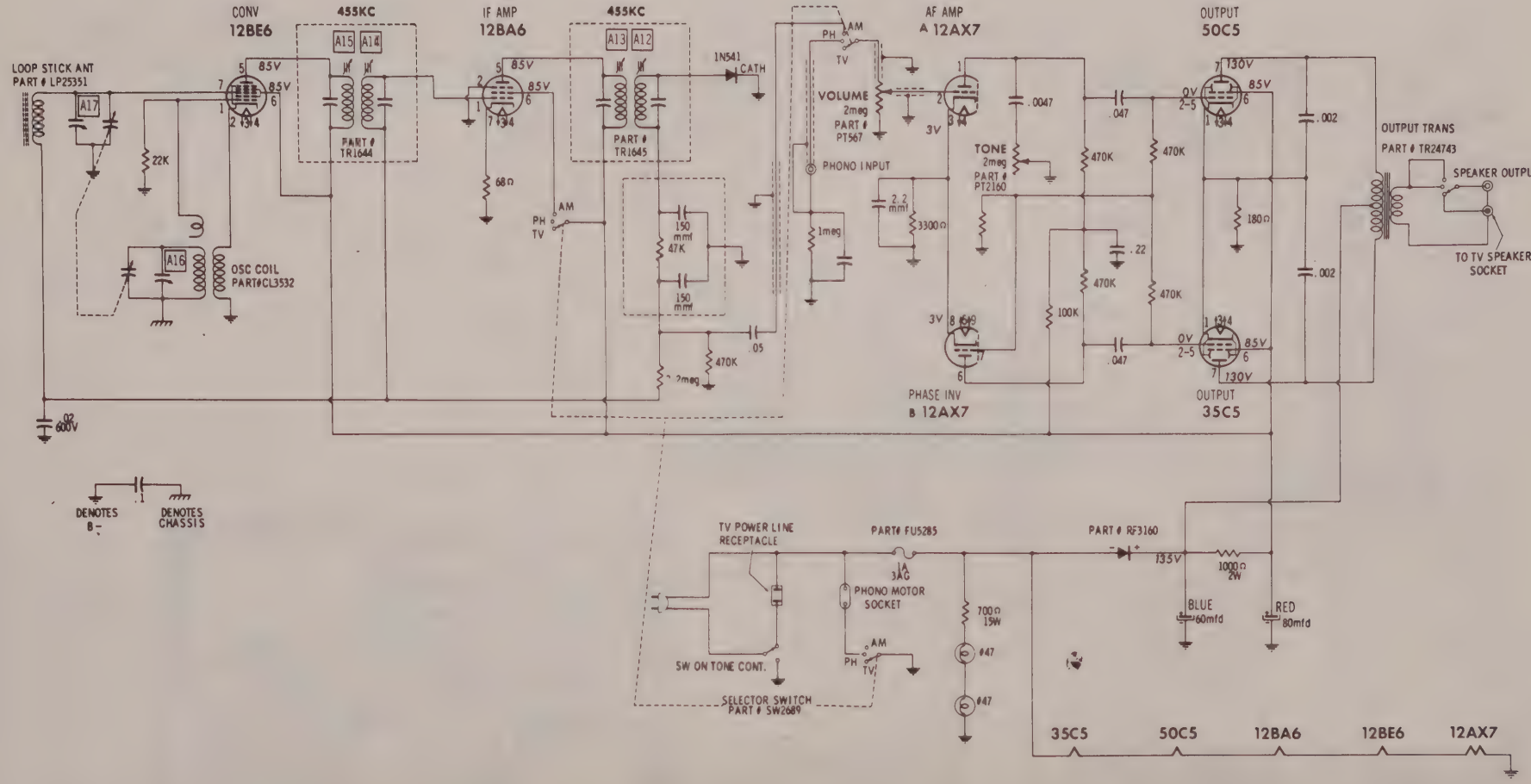

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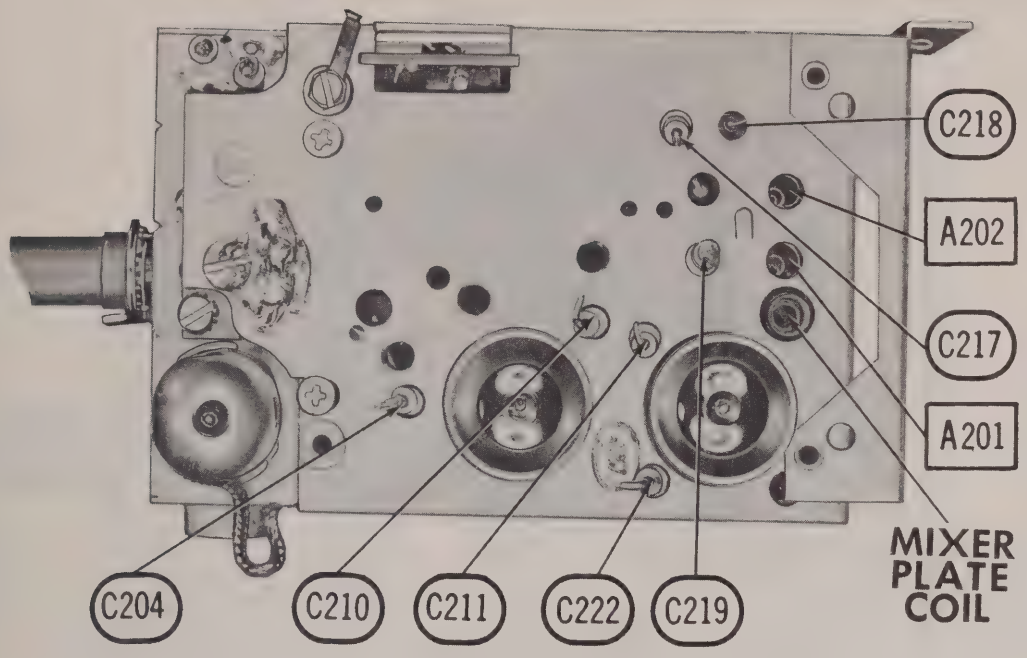
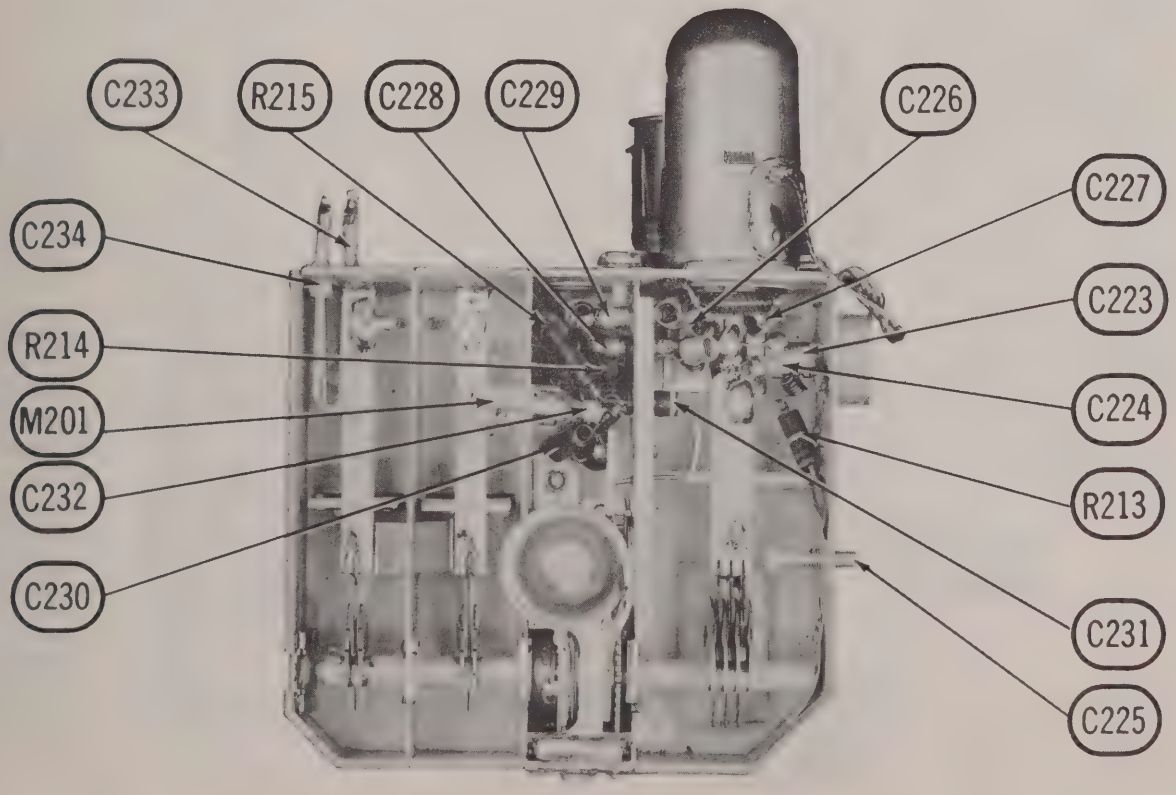
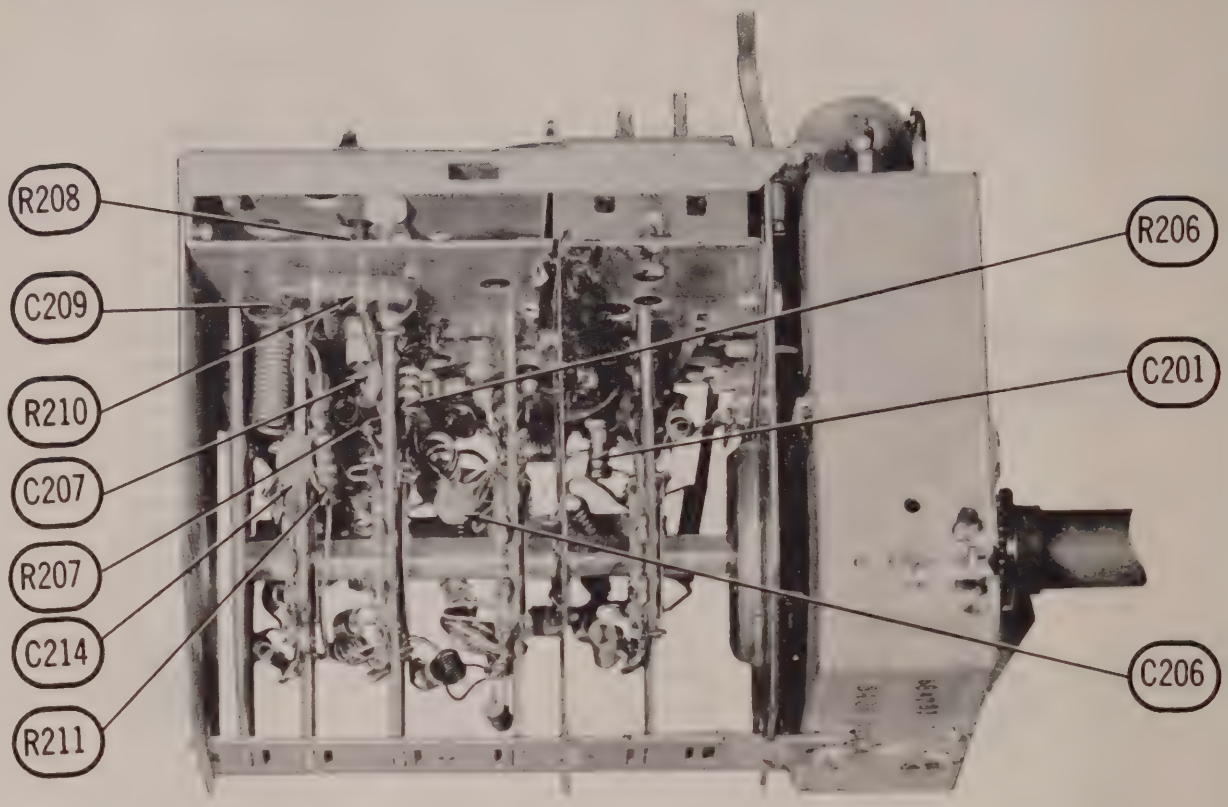
RADIO CHASSIS 134



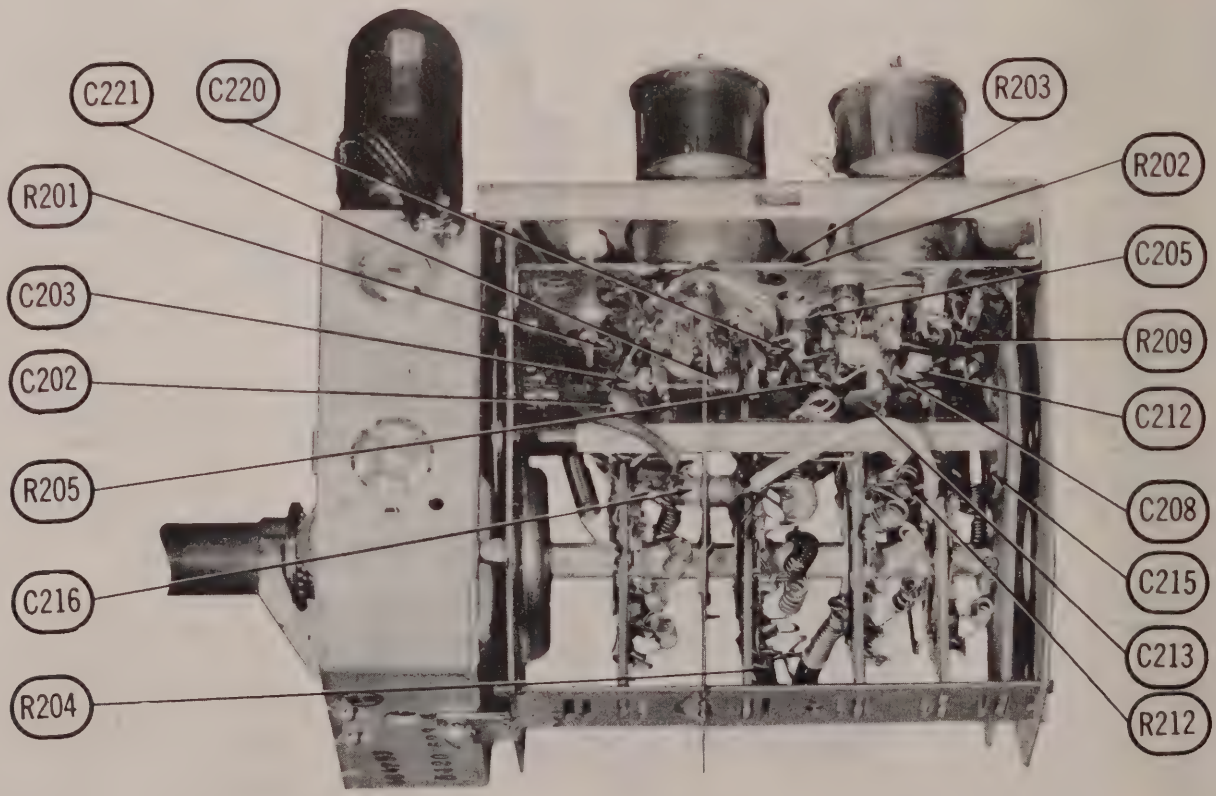
TUNER CL5662 - TOP VIEW



TUNER CL5825 - END VIEW



TUNER CL5662 - LEFT SIDE



TUNER CL5662 - RIGHT SIDE

CHASSIS TOP VIEW

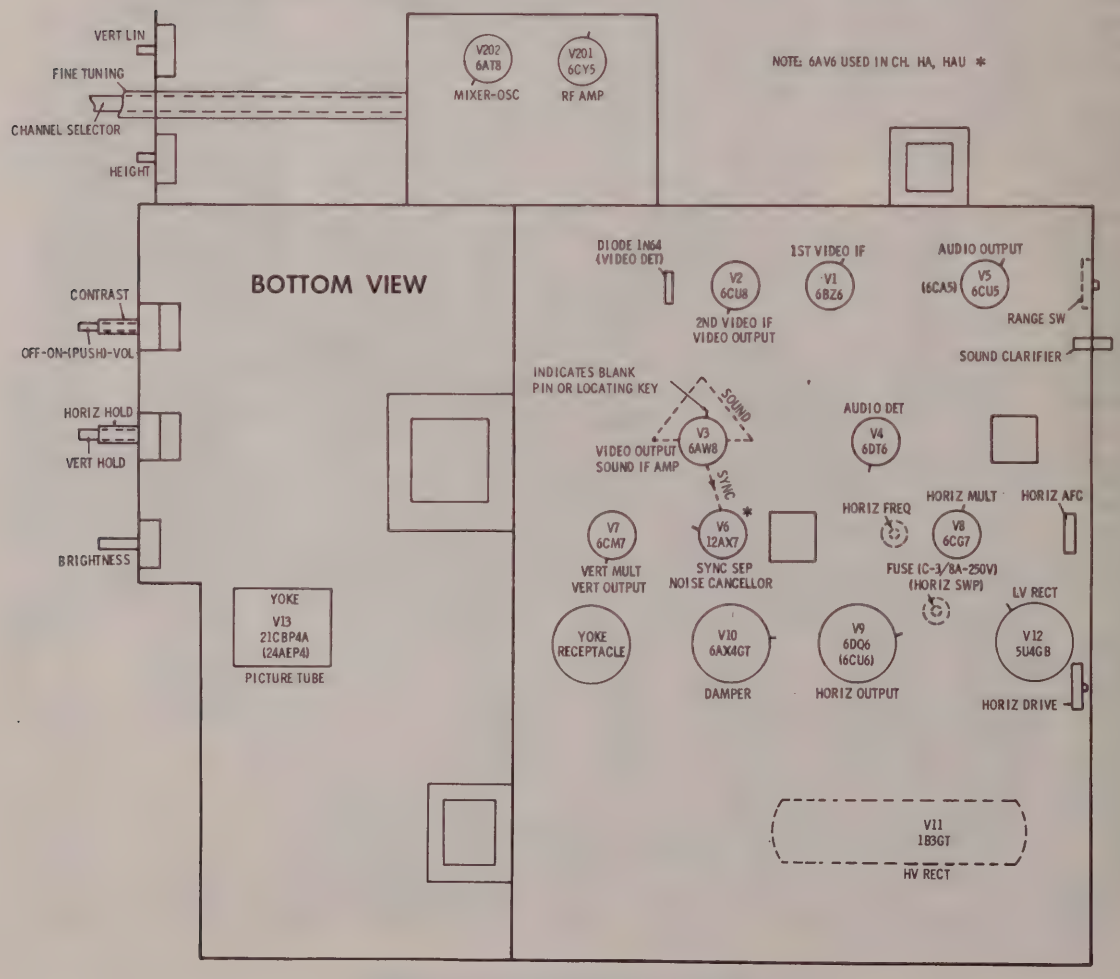
OLYMPIC CHASSIS HA, HAU, HB, HBU, HD, HDU, HF, HFU, HH, HHU, 134

RESISTANCE MEASUREMENTS

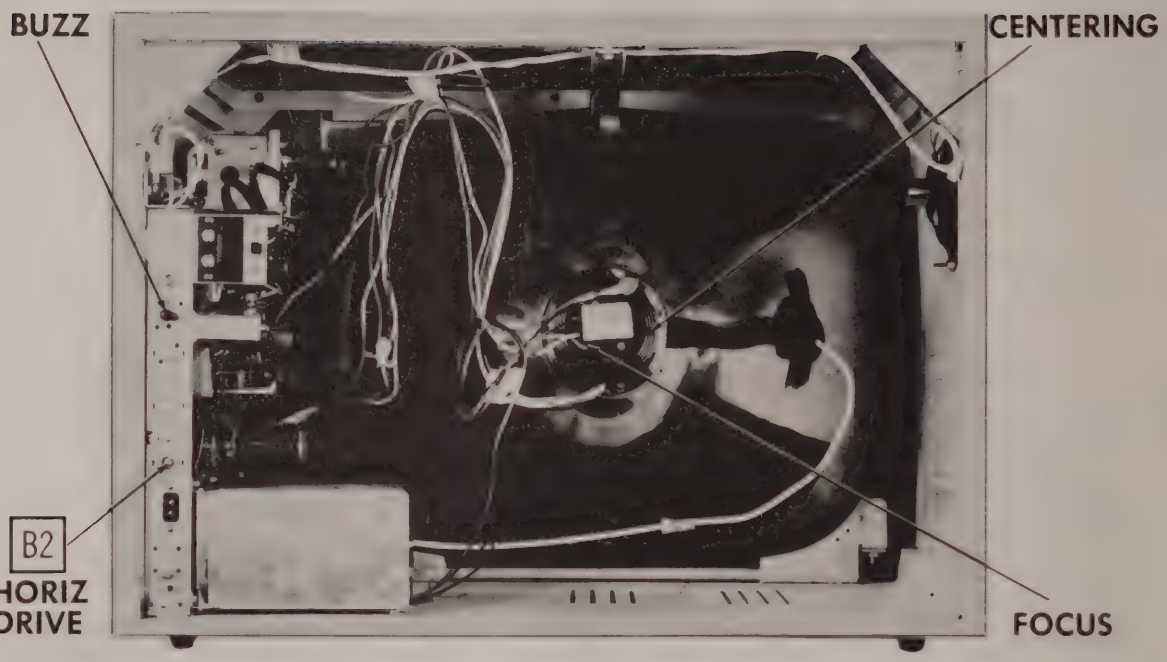
ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6BZ6	1meg	47Ω	.1Ω	0Ω	††330Ω	††330Ω	0Ω		
V2	6CU8	90Ω	††330Ω	††330Ω	0Ω	.1Ω	180Ω	.1Ω	• 8000Ω	†5600Ω
V3	6AW8	0Ω	1meg	†22K	.1Ω	0Ω	100Ω	700K	††.6Ω	6700Ω
V4	6DT6	2.3Ω	1000Ω	.1Ω	0Ω	†270K	††0Ω	560K		
V5	6CU5	¶	500K	.1Ω	0Ω	500K	†390Ω	†560Ω		
V6	12AX7	†330K	1meg	70K	.1Ω	.1Ω	†100K	2.6meg	0Ω	0Ω
V7	6CM7	†2500Ω	NC	0Ω	0Ω	.1Ω	• †1.4meg	• 1.3meg	• 1.6meg	100Ω
V8	6CG7	†43K	1.6meg	820Ω	.1Ω	0Ω	†82K	68K	820Ω	0Ω
V9	6DQ6	TP	0Ω	NC	†8900Ω	470K	TP	.1Ω	0Ω	TOP CAP †54Ω
V10	6AX4GT	NC	TP	¶	NC	†0Ω	NC	0Ω	.1Ω	
V11	1B3GT	PINS 1 THRU 8 HAVE INFINITE RESISTANCE								TOP CAP †584Ω
V12	5U4GB	NC	¶	NC	35Ω	TP	38Ω	TP	¶	
V13	21CBP4A	0Ω	100K	Pin 6 †80K	Pin 10 †80K	Pin 11 • 320K	Pin 12 .1Ω			
V201	6CY5	1meg	0Ω	0Ω	1.4Ω	††.7Ω	††15K	0Ω		
V202	6AT8	15K	††4800Ω	0Ω	0Ω	1.4Ω	††1800Ω	††0Ω	0Ω	100K
ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
• THIS READING WILL VARY. CONTROL SET FOR NORMAL OPERATION.
† MEASURED FROM 265V SOURCE.
†† MEASURED FROM 125V SOURCE.
‡ MEASURED FROM PIN 3 OF V10.

NC NO CONNECTION.
TP TIE POINT.



TUBE PLACEMENT CHART



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Suggested Alignment Tools:
GENERAL CEMENT #5003, 8276, 8721, 8722
WALSCO #2516, 2519

Turn the set on and allow it to warm up for 2 minutes.

Tune in a TV station, preferably with a test pattern.

Connect a clip lead from point ⓑ to chassis. Connect another clip lead across the Horizontal Frequency coil (L20).

Adjust the Horizontal Hold until the picture synchronizes horizontally. (It may float back and forth).

Remove the clip lead from L20. Adjust the Horizontal Frequency slug (B1) until the picture is again in frequency. Remove clip lead from point ⓑ and chassis.

Turn Horizontal Drive Trimmer (B2) counterclockwise until a vertical white line (drive line) appears near the center of the screen, then turn clockwise until line just disappears. If drive line cannot be obtained, adjust B2 for proper width.

If B2 is adjusted, recheck adjustment of B1 and Horizontal Hold.

PHOTOFACT* Folder
*TRADE MARK

SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 14 IN SET 369

MOTOROLA MODELS Y14P10-1, -2, Y14P11-1, -2, 14P10-1, -2, 14P11-1, -2 (CH. TS-425, Y)

Motorola Models Y14P10-1, Y14P10-2, Y14P11-1, Y14P11-2 (Ch. TS-425Y), 14P10-1, 14P10-2, 14P11-1, 14P11-2 (Ch. TS-425) were run in Photofact Folder 14 - Set 369 and Production Change Bulletin 195, Photofact Folder 4 - Set 382.

The following changes were made during late production.

REPLACEMENT OF SILICON RECTIFIERS

M1 and M2 (Silicon Rectifiers), Part #48K745525 must be replaced in pairs. Failure of one rectifier will normally result in damage to the other. If 1N1082 rectifiers are not available, use one 1N1084 (Part #48C743273) as a substitute for the 1N1082 rectifiers. Complete the circuit by shorting the adjoining rectifier holder with a piece of wire.

TS-425-A-11

INCREASING AUDIO OUTPUT

A 20mfd @ 25V capacitor is added between pin 1 of V10 and ground.

T1 (Vertical Output) is changed to Part #25K745051 and relocated.

L27 (Filter Choke) is changed to Part #25K745052.

TS-425-A-12

VOLTAGE RATING INCREASED

C54,1000mmf capacitor voltage rating is increased from 500V to 1200V.

TS-425-B-00

COMPONENT CHANGES

R93, 5Ω 5W fusing resistor is changed to a 5Ω 5W fixed type resistor.

A 1.6 Amp. fuse is added in series with the AC line and R93.

C3 is decreased from 2mfd to .25mfd.

R19 is increased from 470Ω to 1500Ω.

R23 is increased from 470Ω to 1500Ω.

R33 is increased from 330K to 680K.

R34 is increased from 1meg to 2.2meg.

TO INCREASE AUDIO OUTPUT

R52 is increased from 120Ω to 180Ω.

SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 3 IN SET 392

ADMIRAL MODELS 331, 335, 338 (CH. 3J1A)

Admiral Models 3J14, 3T16 (Ch. 3T1) were run in Photofact Folder 3 - Set 392.

Models 331, 335, 338 (Ch. 3J1A) are electrically identical except for the following changes.

COMPONENT CHANGES

V1, AF Amp., is changed to a 12AV6. A partial schematic showing the new circuit, is given on the reverse side.

C1D is disconnected from junction of R7 and R8 and reconnected to pin 8 of V2, audio output.

R8 is omitted.

R7 is increased from 1500Ω to 2200Ω.

R4 is omitted.

PRODUCTION CHANGE
BULLETIN 217

PRODUCTION CHANGE
BULLETIN 217

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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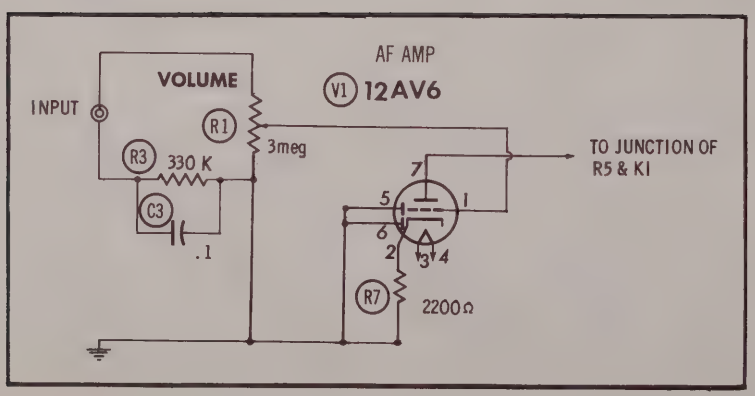
SET 438 FOLDER 3


AF AMP
VOLUME
V1 12AV6
INPUT
R1
3meg
R3
330 K
C3
.1
TO JUNCTION OF
R5 & K1
7
5
1
6
2
3
4
R7
2200Ω

SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 2 IN SET 381

GENERAL ELECTRIC MODEL 14P1209

General Electric Models 14P1210, 14P1211, 14P1212 ("Q2" Line) were run in Photofact Folder 2 - Set 381.

Model 14P1209 is added along with late production changes with the publication of this bulletin.

COMPONENT CHANGES

UHF Tuner changed to Part #WT85X21.

The 2200Ω 2W resistor from B+ to UHF Tuner is increased to 3000Ω 2W.

The Tuner Output link cable is shortened from 6" to 4½" (Part #WT65X15). This cable is used with RJX-099, 100 VHF Tuners only.

TO MINIMIZE PICTURE SIDE LOCK

A 39mmf capacitor is added across R63.

COMPONENT CHANGES

C54 is increased from 5000mmf to 10000mmf.

C57 is decreased from 1000mmf to 910mmf.

R61 is decreased from 1100Ω to 1000Ω.

C41, a 3mmf ceramic capacitor, is changed to a 3.3mmf composition capacitor.

C1, a 375mmf 150V capacitor, voltage rating is increased to 165V.

SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 1 IN SET 392

MAGNAVOX (CH. U24-05AA, U24-07AA, V24-05AA, V24-07AA)

Magnavox Chassis U24-01AA, U24-02AA, U24-03AA, U24-04AA, U24-06AA, V24-01AA, V24-02AA, V24-03AA, V24-04AA, V24-06AA (24 Series) were covered in Photofact Folder 1 - Set 392.

Chassis U24-05AA, U24-07AA, V24-05AA, V24-07AA are electrically identical, except for the changes given in this bulletin.

COMPONENT CHANGES

A 680mmf capacitor is added from junction of C2D, C3 and pin 8 of 6DG6GT (audio output) to ground.

R8 is decreased from 3000Ω to 2400Ω in the U24-07AA chassis.

C5 is omitted in the U24-07AA chassis.

R12 is increased from 1000Ω to 1500Ω.

R13 is increased from 1000Ω to 1500Ω.

R15 is increased from 36K to 47K.

R16 is increased from 1000Ω to 1500Ω.

R9 is increased from 1000Ω to 1500Ω.

R66 is decreased from 12K to 6800Ω.

A 4700Ω, ½W resistor is added in series with R66 to ground.

A 1000mmf capacitor is added across R66.

R71 is increased from 2700Ω to 8200Ω.

R69 is omitted.

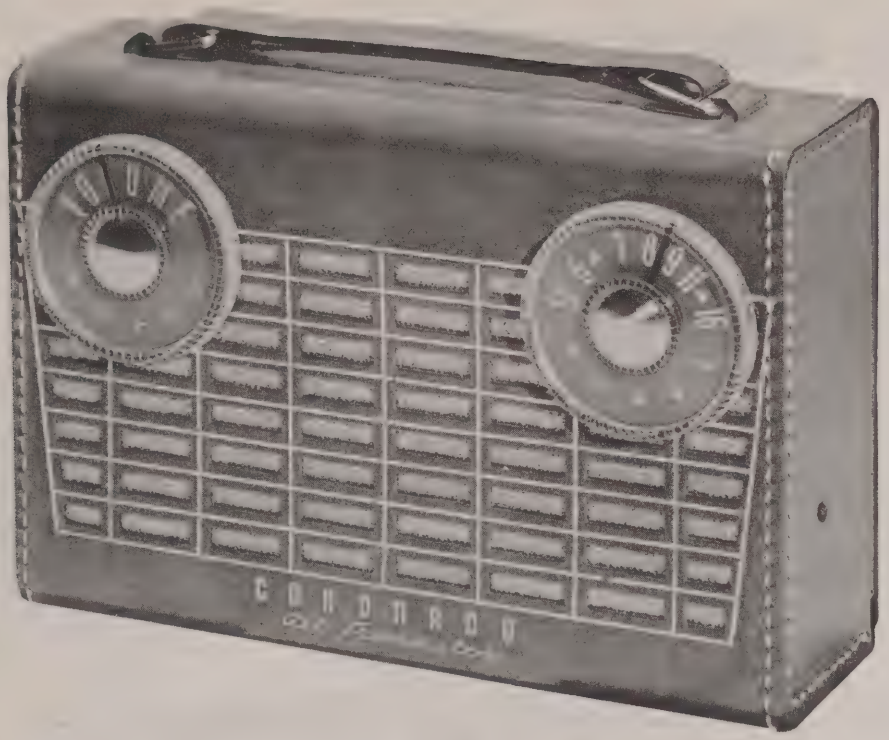
An 8200Ω resistor in series with a 68mmf 2KV capacitor is added from pin 3 of V12 (damper) to junction of R71 and terminal 6 of T5 (horiz. output).

R53 and R54 are electrically transposed.

A 680K resistor is added across R53.

T5 (horiz. output) is changed to Part #360700-2. With this change, terminal 4 is not used, terminal 3 of Deflection yoke is disconnected from terminal 4 and reconnected to terminal 5.

PHOTOFACT* Folder



TRADE NAME	Coronado Model RA48-9898A
SUPPLIER	Gamble - Skogmo, Inc., 15 N. 8th Street, Minneapolis, Minnesota
TYPE SET	Battery Operated Portable AM Transistorized Receiver
POWER SUPPLY	9 Volts DC
RATING	26MA @ 9 Volts DC
TUNING RANGE—BROADCAST	535-1650KC

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1mfd	High side to antenna stator lug of tuning gang. Low side to chassis.	455KC (400~ Mod	Tuning gang fully open	Across voice coil	A1, A2	Adjust for maximum output.
2.		Loop	1650KC	"	"	A3	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		"	540KC	Tuning gang fully closed	"	A4	"
4.		"	1400KC	Tune to 1400KC signal	"	A5	"
5.		"	600KC	600KC	"	A4	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output while rocking tuning gang. Repeat steps 4 and 5.

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H607R

CORONADO
MODEL RA48-9898A
CORONADO
MODEL RA48-9898A
SET 438 FOLDER 4

PARTS LIST AND DESCRIPTIONS

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA				NOTES
			CBS PART No.	RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
X1	2N168A	Converter		2N439			NPN
X2	2N292	IF Amplifier		2N439			NPN
X3	2N265	AF Amplifier		2N407	2N362	2N406	PNP
X4	2N241A	Output		2N270	2N631	2N241A	PNP

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	CORONADO PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1	50	10	150-134	XPP-10050	NL50-10	TT10X50	ML50-15		TE-1160
C2	25	10	150-133	XPP-10025	NL25-10	TT10X25	ML30-15		TE-1118
C3	10	12	①	XPP-12010	NL10-15	TT12X10	ML10-15		TE-1128
C4	50	7	②	XPP-10050	NL50-10	TT10X50	ML50-15		TE-1160
C5	50	5	150-130	XPP-6050	NL50-6	TT6X50	ML50-6		TE-1100
C6	50	10	150-134 ③	XPP-10050	NL50-10	TT10X50	ML50-15		TE-1160

① Some versions may use 8mfd in this application (Part #150-131).
② Some versions may use 50mfd in this application (Part #150-130).
③ Not used in some versions.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	CORONADO PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C7	20000		158-114	BPD-002	DD-202	BYA10D2	DC522	5HK-D2	
C8	10000		158-113	BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C9	10000		158-113	BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C10	50000		158-111	BPD-05	DF-503			5HK-S5	
C11	50000		158-111	BPD-05	DF-503			5HK-S5	
C12	50000		158-111	BPD-05	DF-503			5HK-S5	
C13	50000		158-111	BPD-05	DF-503			5HK-S5	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	CORONADO PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	10K	½	120-134	B-15	A47-10K-Z	Q13-116	U18	Volume
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
C	Switch			KB-1 or KR-1*	SWE-12	76-1	US-26	

* Use KR with CRL "red label" controls and KB with "blue label" controls.

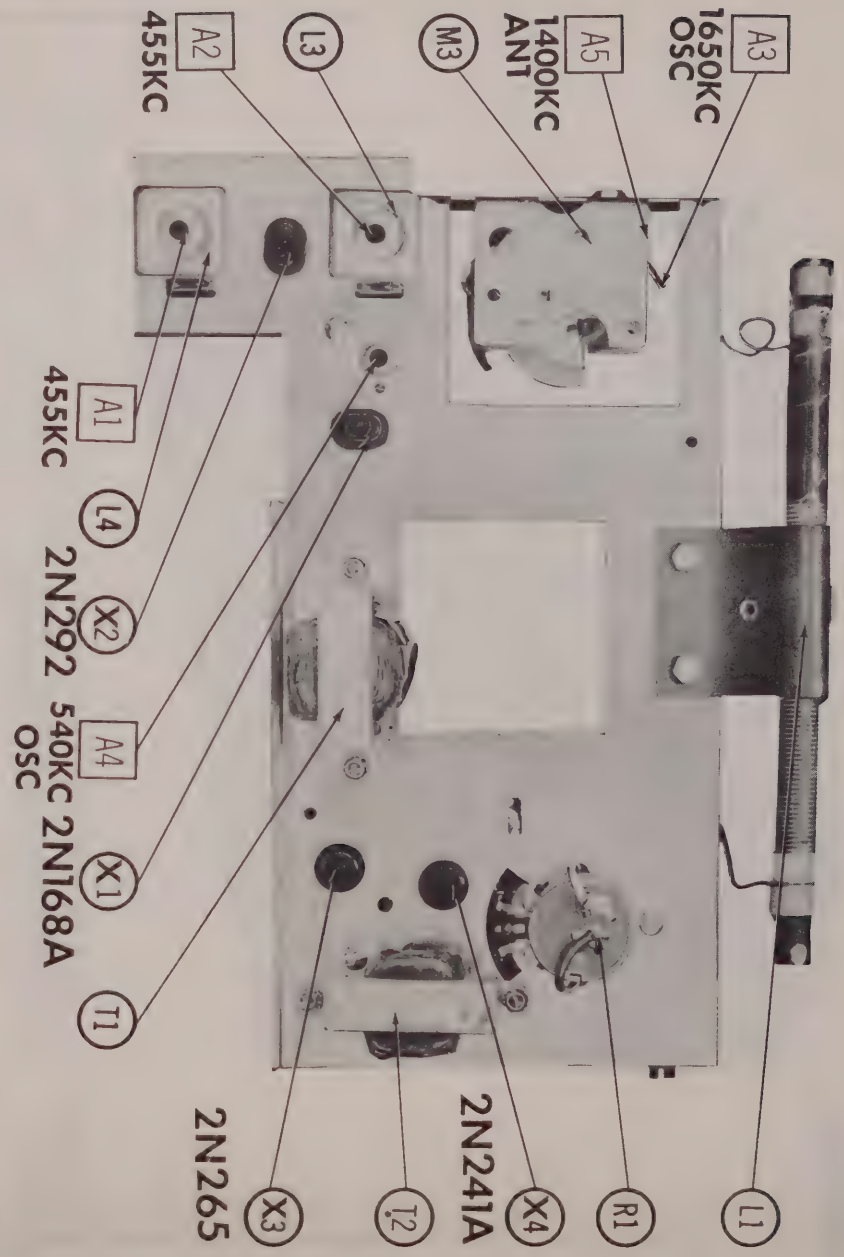
RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		CORONADO PART No.	NOTES
	OHMS	WATT		
R2	10K 5%		180-190	
R3	27K		180-193	
R4	470Ω		180-188	
R5	1500Ω		180-192	
R6	120K		180-202	
R7	12K		180-121	
R8	470Ω		180-188	

ITEM No.	RATING		CORONADO PART No.	NOTES
	OHMS	WATT		
R9	330Ω		180-187	
R10	47K 5%		180-200	
R11	10K 5%		180-190	
R12	1000Ω 5%		180-186	
R13	1000Ω 5%		180-186	
R14	5600Ω		180-203	
R15	68Ω		180-149	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					
		CORONADO PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	NOTES
L1	Loop Stick	132-134					
L2	Osc. Coil	136-133					
L3	Input IF	130-130					
L4	Output IF	130-130					

TRANSFORMER (INTERSTAGE)

ITEM No.	TURNS RATIO		REPLACEMENT DATA						NOTES
	PRI.	SEC.	CORONADO PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	4.7	: 1	138-121						

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	CORONADO PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	650Ω	3-4Ω	138-127							

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	CORONADO PART No.	QUAM PART No.	
SP1	4"	PM	3-4Ω	175-129C	4A07	

BATTERIES

ITEM No.	VOLTAGE	CORONADO PART No.	REPLACEMENT DATA						NOTES
			BURGESS		EVEREADY		MALLORY		
			"A"	"B"	"A"	"B"	"A"	"B"	
M1	9V	17-402		1		935		M-14	6 Used

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		CORONADO PART No.	CBS PART No.	SYLVANIA PART No.	
M2	1N295		1N60	1N295	Detector (Pigtail)

MISCELLANEOUS

ITEM No.	PART NAME	CORONADO PART No.	NOTES
M3	Tuning Cap.	160-129	2 Gang (Ant. 23-270mmf, Osc. 23-126mmf)
M4	Jack	170-134	
	Earphone	3DW5300	Earphone

CABINETS & CABINET PARTS

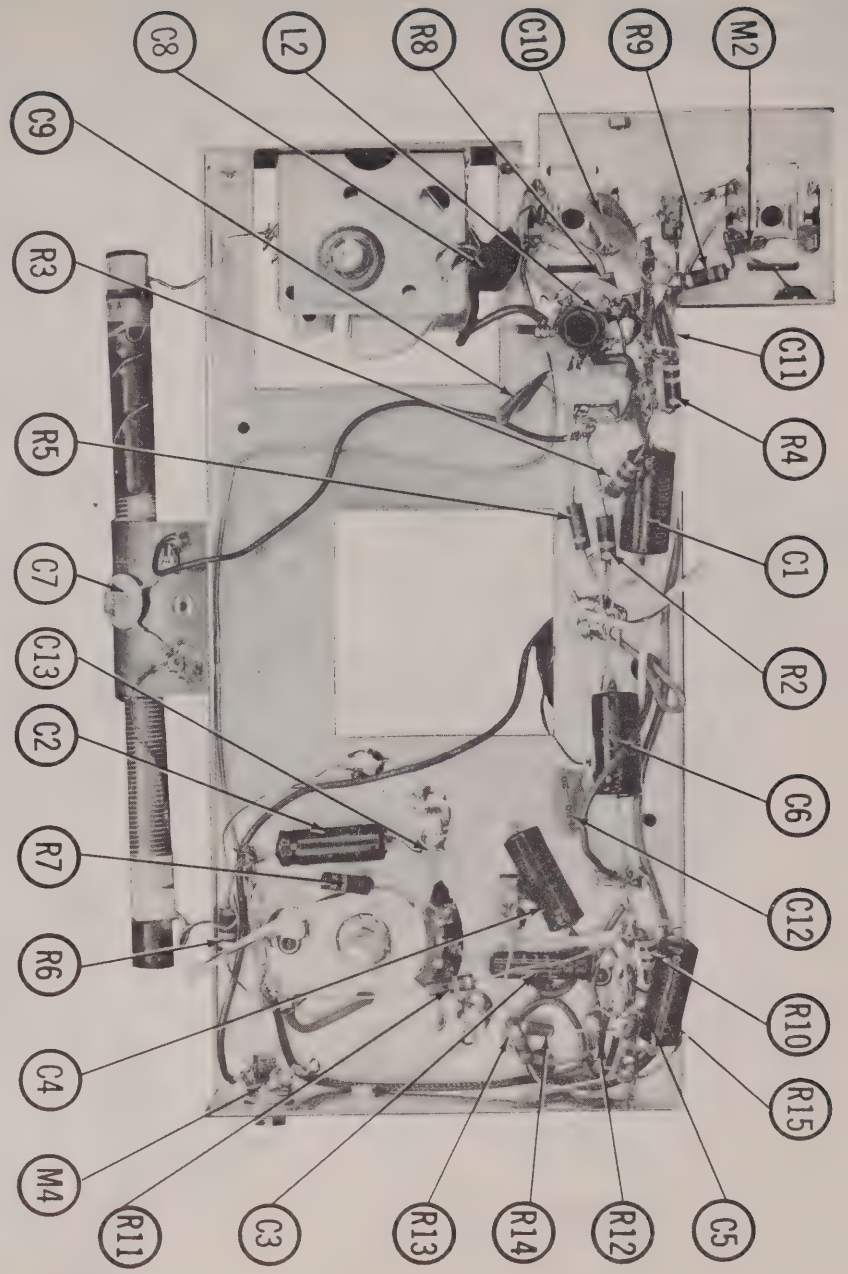
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

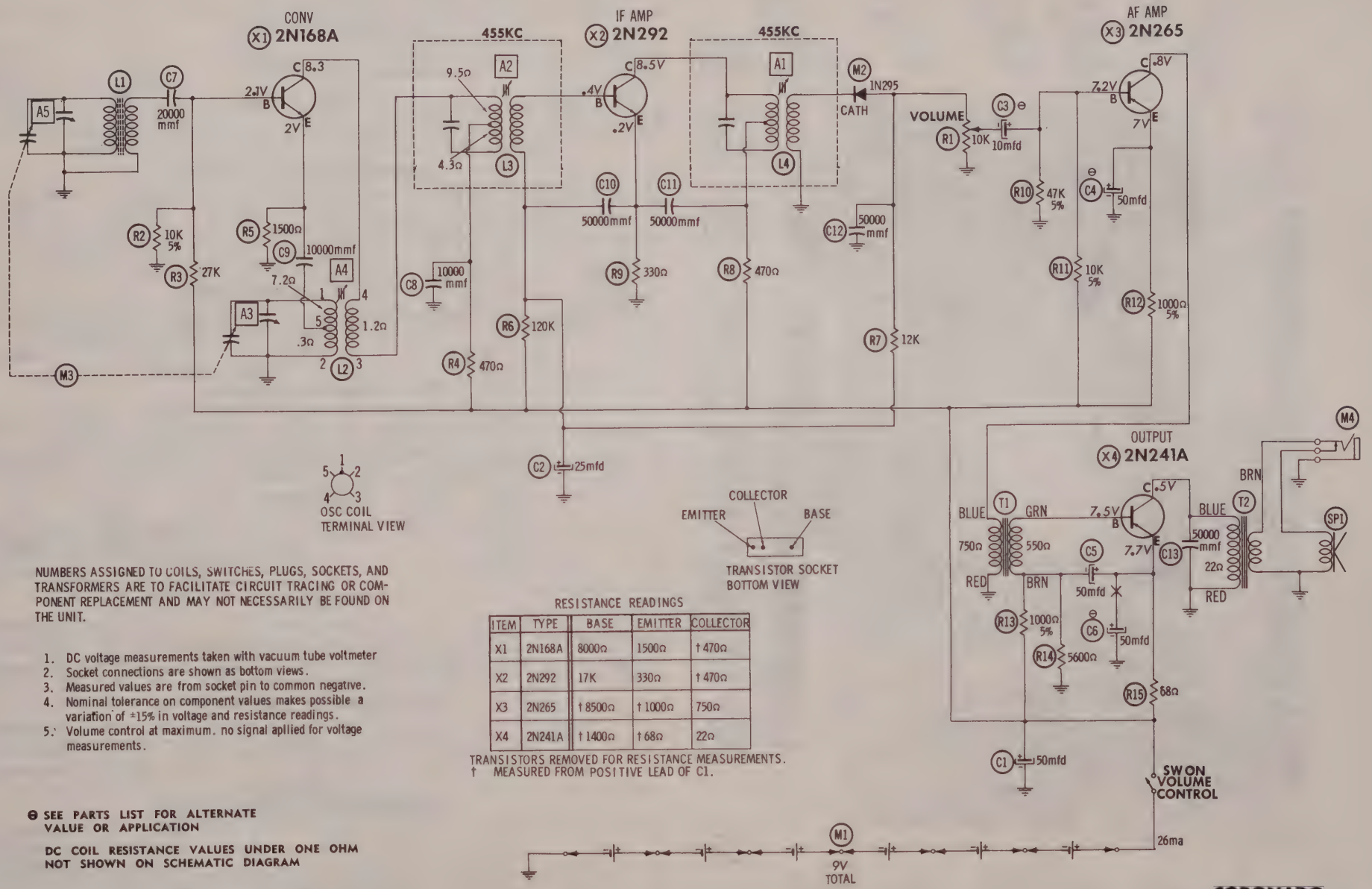
NAME	PART NO.	DESCRIPTION
Knob	220-152	Tuning, On-Off-Volume
Cabinet	210-148	
Battery Case	195-197	Bottom Section, Includes Contact Springs
Battery Case	195-196	Top Section

WIRING DATA

General-use Unshielded Hook-up Wire .....Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

CHASSIS—BOTTOM VIEW





NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

1. DC voltage measurements taken with vacuum tube voltmeter
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
5. Volume control at maximum. no signal applied for voltage measurements.

RESISTANCE READINGS

ITEM	TYPE	BASE	EMITTER	COLLECTOR
X1	2N168A	8000Ω	1500Ω	†470Ω
X2	2N292	17K	330Ω	†470Ω
X3	2N265	†8500Ω	†1000Ω	750Ω
X4	2N241A	†1400Ω	†68Ω	22Ω

TRANSISTORS REMOVED FOR RESISTANCE MEASUREMENTS.
† MEASURED FROM POSITIVE LEAD OF C1.

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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CORONADO
MODEL RA48-9898A

PHOTOFACT* Folder

*TRADE MARK

FERROGRAPH
MODEL 3 A/N

FERROGRAPH
MODEL 3 A/N

GENERAL INFORMATION

Model 3A/N Ferrograph tape recorders record and play back two tracks of material on standard-width recording tape. Any size reel up to 7" can be used. A meter on the unit provides correct recording volume setting.

Since the erase head is automatically positioned when unit is in Record position, new recordings can be made on previously recorded tape. Recordings can be made from a radio, television receiver, or phonograph, in addition to those made directly from a microphone.

This tape recorder records and plays back at two speeds, 7 1/2 and 3 3/4 ips. With both tracks of the tape, recording time is as follows:

Reel Size	3 3/4" Speed	7 1/2" Speed
5" (600 ft.)	1 Hour	1/2 Hour
7" (1200 ft.)	2 Hours	1 Hour

The Model 3A/N operates on 110-127 volts, 60 cycles AC only. Before connecting unit to line supply, be certain it agrees with the foregoing specifications.

Distributed in U. S. A. by:
Ercona Corporation
16 West 46th Street
New York 36, New York

This material compiled and published by

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C375

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SPECIFICATIONS

Size:

18 1/2" x 17 1/2" x 9 3/4"

Weight:

49 3/4 lbs.

Tape Speeds:

3 3/4 and 7 1/2 ips

Erase and Bias Frequency:

Approximately 53 kc

PREPARING FOR OPERATION

1. Plug power cord into socket marked A.C. Mains at rear of unit.
2. Insert power cord into a convenient wall receptacle of proper rating.
3. Set speed change knob to 3 3/4 or 7 1/2 ips, as desired.

CAUTION: When changing from one speed to another, the mechanism should be stopped to prevent undue wear on idler wheels.

OPERATING INSTRUCTIONS

Threading Tape

1. Turn selector switch to Wind On position.
2. Place full reel of tape on left-hand spindle and empty reel on right-hand spindle.
3. Unwind enough tape from supply reel so that tape can be secured to empty reel and give empty reel a few turns.
4. Pull more tape from supply reel to provide a loop and drop the tape through the V slot in head cover.

NOTE: Be sure tape is in front of 1/8" diameter peg which can be seen toward the right side of cover and that tape is at bottom of slot.

5. Take tape over the two chromium guides and take up slack by manually rotating the reels.

To Record from Microphone

1. Turn unit on and allow sufficient time to warm up.
2. Plug microphone into socket labeled Input 1.
3. Turn Main Selector Switch to Record position and move Motor Starting Switch to On position.
4. Adjust Gain control so that Peak Signal Level meter does not exceed 8 on the meter scale; speak into microphone in a normal voice.

To Record from Radio, Television Receiver, or Phonograph

1. Make a connecting cable with twisted wire and jack plug furnished with unit.
2. For radio or television recording, connect cable to voice-coil terminals of radio or television receiver speaker with alligator clips and insert jack plug into Input 2.
3. For phonograph recording, connect a proper jack plug to Phono output and insert into Input 2.
4. Proceed with recording as described under "To Record from Microphone."

To Use Second Track

1. After all tape has been wound onto the take-up reel, the recorder will stop automatically.
2. Remove reel with tape and place on left-hand (supply) pan.
3. Place empty reel on right-hand (take-up) pan.
4. Thread tape (see "Threading Tape") and proceed with recording as described under "To Record from Microphone" or "To Record from Radio, Television Receiver, or Phonograph."

To Erase Tape

When Main Selector Switch is in Record position, the erase head is automatically positioned and erases any previous recording while a new one is being made. Material no longer needed may be erased, without recording, by turning Main Selector Switch to Record position and Gain control to Zero position. One track is erased at a time. To erase second track, reverse reels and repeat the foregoing procedure.

To Play Recordings

1. Thread tape as described under "Threading Tape."
2. Set Speed Change knob to speed at which recording was made.
3. Turn Main Selector Switch to Playback position.
4. Adjust Gain, Treble, and Bass controls for desired listening level.

FUNCTION OF CONTROLS

On-Off Switch

Turns power on or off for entire unit.

Gain

Varies loudness for recording or playback.

Treble

Controls high note content.

Bass

Controls low note content.

Main Selector Switch

Selects the different operations of unit--Playback, Wind On, Wind Back, and Record.

Motor Starting Switch

Moving this control in direction of arrow on tape deck sets the tape in motion. When unit is in Record or Playback position, this switch automatically releases after all tape is wound onto one of the reels.

Stop

To stop the tape, depress Stop button; the Motor Starting Switch will open, cutting the power to the driving motor.

Speed Selector

Turn knob to right for High Speed (7 1/2 ips); to left for Low Speed (3 3/4 ips).

DISASSEMBLY INSTRUCTIONS

To Remove Tape Transport Mechanism from Case

1. Remove two top deck securing screws.
2. Remove plastic stop strap from bottom of tape transport mechanism.
3. Mark all interconnecting cables per schematic and unplug.
4. Remove four nuts and screws from hinges on rear of case and remove tape transport mechanism.

To Remove Amplifier from Case

1. Remove two wood screws from top rail at front of case.
2. Remove four machine screws (two on each side) from top of amplifier.
3. Unfasten cable clamps and remove amplifier.

To Remove Power Supply and Oscillator Chassis from Case

1. Remove four hex nuts (two on each side) from chassis.
2. Lift chassis to clear mounting bolts and slide forward to clear cutout in rear of case.
3. Remove chassis from case.
4. To reassemble, reverse the foregoing procedure.

CLEANING

Most defects, other than wear or breakage, can be traced to dirty surfaces. Record/reproduce head (17), capstan, and pinch roller (30) may accumulate tape coating oxide, worn off tape as it passes these parts. This oxide should be removed periodically, since it will cause faint recording and poor playback. Wipe the foregoing surfaces carefully with a clean cloth. If dirt is caked or hard and does not come off with a dry cloth, dampen the cloth slightly.

LUBRICATION

All rotating parts are fitted with either self-oiling bronze bearings or grease-packed ball races. Under normal usage, no further lubrication is necessary.

Sliding members should be lubricated only if bad or noisy movement is present. All dirt and tape deposit should be removed from these parts first. Use lubricant sparingly on these parts. Do not allow oil or grease to contact the capstan.

MECHANICAL ADJUSTMENTS

Tape Guide

While tape is moving, adjust tape guides so that tape will not catch on sides of reels. To adjust tape guides for height, twist top and bottom of tape guides in opposite directions on support screw to unlock.

Brake

1. To tighten brakes, loosen brake adjusting screw (10) and move brake shoe away from reel spindle.
2. If brake shoes are too tight, loosen brake adjusting screw (10) and move brake shoe toward reel spindle.

Head

Use standard 6-kc or 12-kc alignment tape. Remove front and rear escutcheons. Clean pole pieces of play-record head with a good commercial head cleaning agent. Then proceed as follows:

1. Thread alignment tape on recorder and set tape in motion.
2. Rock head from side to side on mounting roller by the four head adjusting screws (17A) until maximum output is obtained.

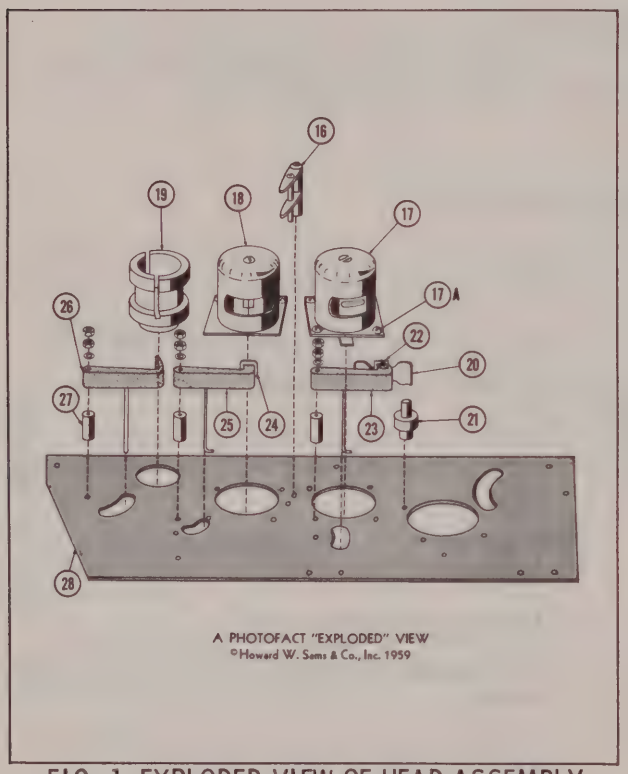


FIG. 1 EXPLODED VIEW OF HEAD ASSEMBLY

Recording Level

1. Turn Main Selector Switch to Record and Gain control to zero.
2. Connect VTVM to pins 4 and 8 of plug #3.

Note: Bias voltage for each recorder is on a label on plate under flywheel (37).

3. Adjust Peak Signal Meter to zero.
4. Feed 400 cycles into Input 1 at a level of approximately 10 millivolts.
5. Connect an AC voltmeter and an oscilloscope between pins 3 and 7 on auxiliary socket.
6. Adjust Gain control until Peak Signal Meter reads 8.
7. AC voltmeter should read between 18 and 25 volts.
8. Adjust Gain control until Peak Signal Meter reads 6; then record a short length of tape at 7 1/2 ips. Stop tape and mark; then record another short length of tape with Peak Signal Meter at 7, 8, and 9.
9. Rewind test tape and play back into an oscilloscope. Measure amount of distortion for each signal input level and note which level produces not more than 5% distortion on peaks. This reading will be the proper peak signal level.

Bias

1. Record a 200-cycle note at a level of 3 on Peak Signal Meter, with bias voltages of 6, 8, 10, 12, and 14 volts, measured across pins 8 and 4 of plug #3 with a VTVM. These voltages are obtained by adjusting R7.
2. Playback test recording with all controls at maximum clockwise rotation. Observe output voltages across pins 3 and 7 on Auxiliary Socket, corresponding to each bias setting.
3. Correct bias setting is a voltage slightly higher than that giving maximum signal output.

Hum Level

1. Connect an oscilloscope between pins 3 and 7 of Auxiliary Socket.
2. Turn on motors.
3. Rotate power transformer for minimum hum pickup.

NOTE: With Gain control turned fully clockwise, hum voltage should not exceed .75 volt rms with motors running and then with motors stopped.

Erase Link

Erase link on rear panel of unit serves two purposes:

1. Removal of link from its socket will prevent a recording from being accidentally erased.
2. Attach a 5,000-ohm variable resistor to a new plug, insert into erase link socket, turn variable resistor to maximum, start recorder and place in Record position, and recording will play.

To insert spoken commentaries without changing functions on recorder, slowly rotate variable resistor to minimum position and speak into microphone. With variable resistor in minimum position, material on tape will be erased so that new material can be recorded. After material has been recorded, slowly rotate variable resistor to maximum position to cut out the erase and bias.

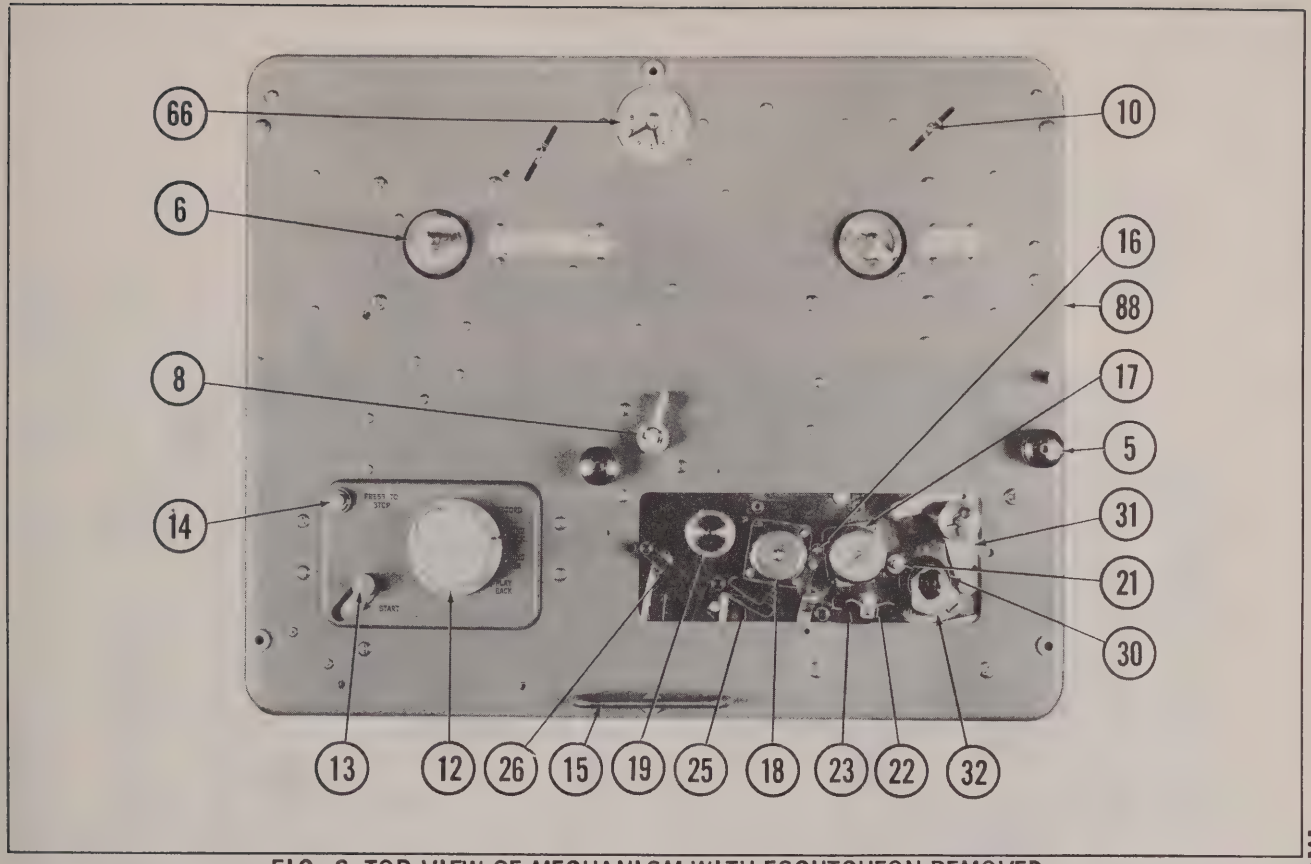


FIG. 2 TOP VIEW OF MECHANISM WITH ESCUTCHEON REMOVED

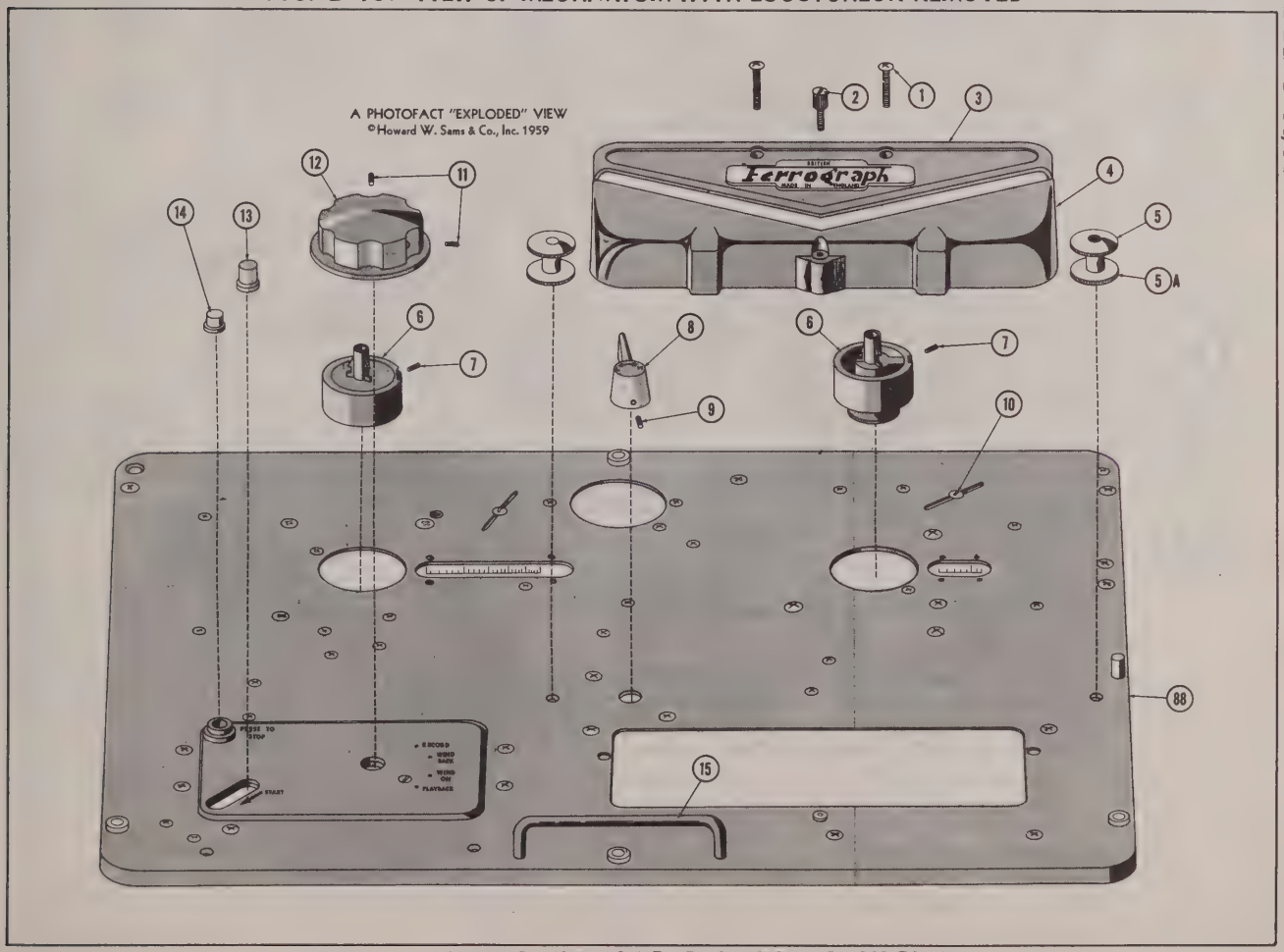


FIG. 3 EXPLODED VIEW OF PARTS ABOVE DECK PLATE

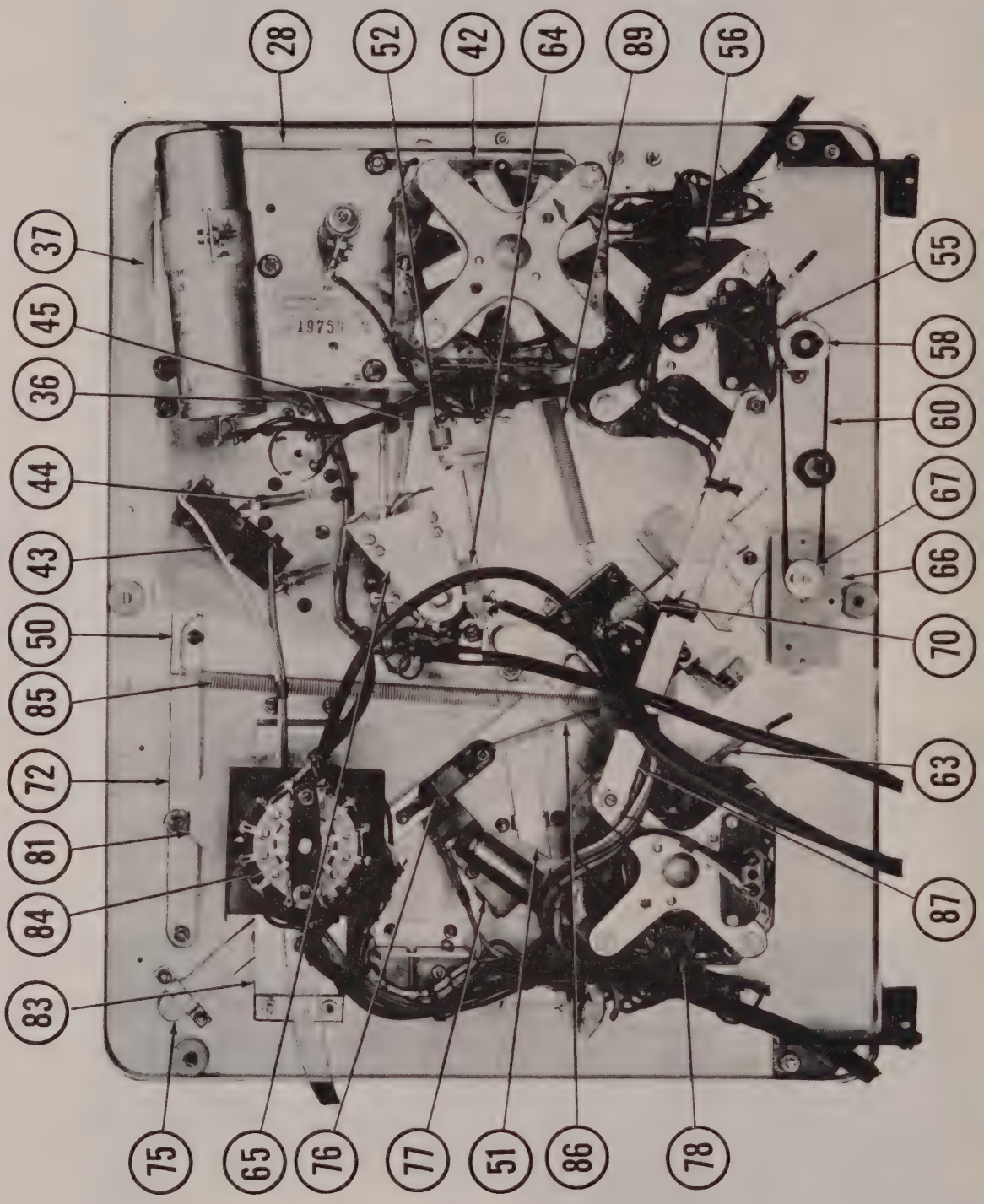


FIG. 4 BOTTOM VIEW OF MECHANISM

TROUBLE CHART

Symptom	Cause	Remedy
Recorder does not start; indicator light does not light.	1. Fuse blown 2. Power cord or plug faulty. 3. Selector knob loose or missing.	1. Replace fuse. 2. Replace power cord or plug. 3. Tighten or replace selector knob.
Motor starts, but starting switch does not lock after amplifier has had time to warm up.	1. Tape not threaded properly.	1. See "Threading Tape."
Start switch releases while unit is on.	1. Low voltage. 2. Selector knob incorrectly positioned.	1. Check voltage to unit. 2. Check selector knob to see if it is correctly positioned for mode of operation.
Tape slips or wows.	1. Dirty capstan or pinch roller (30), or bad splice in tape. 2. Buckled reels scraping deck. 3. Dirt in gate mechanism, preventing proper closure. 4. Oil or grease on rim of idler wheels (39).	1. Clean capstan or pinch roller (30), or resplice tape, making sure splicing tape is trimmed so that it will not stick to guide posts or head. 2. Replace reels. 3. Clean and lubricate gate mechanism. 4. Clean idler wheel (39) and rim with a good cleaning solution.
Recorded tape does not play back.	1. Input plug left in socket. 2. Output speaker plug not disconnected. 3. Tape incorrectly positioned in head box. 4. Piece of splicing tape sticking on head pole pieces. 5. Gain control set at zero.	1. Remove input plug. 2. Disconnect output speaker. 3. See "Threading Tape." 4. Remove splicing tape and clean the head. 5. Rotate Gain control to desired listening level.
Tape plays back with poor frequency response.	1. Accumulation of foreign matter or tape coating oxide on head pole pieces.	1. Clean the head.
Tape erases, but does not record in Record position.	1. Microphone or input plug not properly inserted, or in wrong socket. 2. Microphone cable faulty.	1. Check microphone or input plug for proper connection and correct socket. 2. Replace microphone cable.
Records, but does not completely erase previous recording.	1. Low voltage. 2. Dirt on erase head pole pieces, or splicing tape sticks to erase head (18).	1. Check voltage for proper rating. 2. Clean erase head (18) with a good cleaning fluid.
Records weakly and with very poor frequency response.	1. Dull-coated side of tape not facing the heads.	1. Reverse tape on reels.
Low-pitched hum during playback.	1. Recorder being operated over power cables or near equipment with high external fields.	1. Move recorder away from any power cables or equipment with high external fields.
Hum recorded on tape.	1. Microphone near equipment making hum. 2. Microphone transformer or leads insufficiently shielded. 3. Microphone leads and stand grounded differently.	1. Move microphone out of area of equipment. 2. Make sure transformer and leads are properly shielded. 3. Make sure microphone leads and stand are properly grounded.

MECHANICAL PARTS LIST

Ref. No.	Part No.	Description
1		Back Cover Box Mtg. Screws
2		Front Cover Box Mtg. Screws
3	MP/1209/B	Back Cover Box
4	MP/1209/A	Front Cover Box
5	BP/2092/N	Knurled Nut
5A	BP/2093/N	Knurled Nut Guide
6		Reel Pan
7		Set Screw
8		Speed Change Knob
9		Set Screw
10		Brake Adjusting Screw
11		Set Screw
12		Main Selector Switch Knob
13		Motor Starting Switch Knob
14		Manual Stop Switch Knob
15		Deck Handle
16		Tape Guide
17		Record/Reproduce Head
17A		Head Adjusting Screw
18		Erase Head
19	BP/900/C	Auto Stop & Tape Guide
20	MP/1739	Mu-metal Wing
21	MP/1829	Tape Guide
22	BP/1102/S	Felt Pad
23	MP/1742	Molded Pressure Arm
24	BP/1102/S	Felt Pad
25	MP/1743	Molded Pressure Arm
26	MP/1741	Molded Pressure Arm
27		Spacer
28		Mounting Plate
29	BP/4010/S	Circlip
30	MP/1807	Pinch Roller
31	MP/2138	Rocker Arm
32	BP/187/B	Capstan Bracket
33		Rocker Arm Mtg. Bolt
34		Ball Race
35		Spacer
36		Spring
37		Flywheel
38		Circlip
39	MP/2140	Idler Wheels
40		Capstan Motor Mtg. Plate
41		Grommet
42	DNA1323	Capstan Motor
43	DNA1216A	Auto Stop Switch
44		Spring

Ref. No.	Part No.	Description
45		Idler Wheel Carriers
46		Idler Carrier Guide
47		Idler Carrier Guide
48		Ball Race
49		Spacer
50		Gate Lever
51		Idler Actuating Lever
52	BP/4000/S	Idler Wheel Carrier Spring
53		Bracket
54		Brake Shoes
55	BP/142/B	Rubber Belt (Small)
56	BNA1319B	Take-up Motor
57		Bracket
58	MP/2896	Intermediate Pulley
59		Circlip
60	BP/141/B	Rubber Belt (Large)
61		Rubber Stop
62		Spring Fasteners
63	BP/4005/S	Brake Springs
64	DN2228	Equalizer Switch
65		Speed Change Mechanism
66	BP/890/C	Counter Mechanism
67		Counter Pulley
68		Set Screw
69		Spacer
70	T1404	Hold-in Solenoid
71		Set Screw
72		Gate Actuating Lever
73		Roller
74		Main Starting Bar Bracket
75	MP/1236	Main Starting Bar
76		Motor Switch Actuating Linkage
77	DNA1216B	Motor Switch
78	DNA1319A	Rewind Motor
79		Set Screw
80		Main Starting Bar Bracket
81		Function Selector Cam
82		Set Screw
83		Main Selector Switch Mtg.Plate
84	DN1755	Main Selector Switch
85	BP/4006/S	Spring
86	BP/4005/S	Spring
87		Support Lever
88		Deck Plate
89		Spring

ELECT. PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Pre-Amp	EF86/6267	①
V2	AF Amp	EF86/6267	①
V3	AF Amp	EF86/6267	①

ITEM No.	USE	TYPE	NOTES
V4	Output	EL84/6BQ5	①
V5	Meter Amp	ECC83/12AX7	①
V6	Bias Osc.	EL84/6BQ5	①
V7	Rectifier	EZ80/6V4	①

① Domestic type listed may not be directly interchangeable in some instances.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	FERROGRAPH PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	8	500	BP/756/C		D0180				TVL-2935
B	16	500							
C2A	16	500	BP/757/C	AFH2-69	B0500		TMD-61		TVL-2935
B	16	500							
C3A	8	500	BP/756/C		D0180				TVL-2935
B	16	500							
C4A	16	500	BP/756/C		D0180				TVL-2935
B	8	500							
C5	8	500	①	PRS500V8	BR850	TC82	TD-8-500	MT-5010	TVA-1902
C6	100	25	BP/761/C	PRS25V100	BBR100-25	TC2501	TD-100-25	MTH-2510	TVA-1207
C7	2.5	300AC	BP/717/C ②		CRX3030				

① Some versions may use a 50mfd @ 12VDC(Part No. BP/763/C)
② Some versions may use a .75mfd@ 450VAC(Part #BP/715/C)

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	FERROGRAPH PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C8	.1	350	BP/708/C	P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C9	.02	350		P488N-02		CUB4S2	GEM-412	4TM-S2	①
C10	.01	350		P488N-01	D6-103	CUB4P1	GEM-411	4TM-S1	①
C11	2000		BP/517/C						2%
C12									
C13									
C14	200		BP/541/C	BPD-0002	DD-201	L10T2	UC-532	10GAB-T2	
C15	500		BP/538/C	BPD-0005	DD-501	L10T5	B-350	10GAB-T5	
C16	.05	500	BP/706/C	P688N-05	DF-503	CUB6S5	GEM-615	6TM-S5	
C17	.1	350	BP/708/C	P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C18	.05	500	BP/706/C	P688N-05	DF-503	CUB6S5	GEM-615	6TM-S5	
C19	.1	350	BP/708/C	P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C20	.25	150		P288N-25		CUB2P25	GEM-2025	2TM-P25	
C21	25		BP/539/C	1469-000025	DTZ-25	22R5Q25	MCE215		5%
C22	.5	500	BP/714/C	P688N-5		ST6P5	GEM-605	6TM-P5	
C23	.1	350	BP/708/C	P488N-1	DF-104	CUB4P5	GEM-401	4TM-P1	
C24	.5	150	BP/712/C	P288N-5		CUB2P5	GEM-605	6TM-P5	
C25	4000		BP/520/C						2%
C26	.1	350	BP/708/C	P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C27	10000		BP/522/C						2%
C28	.1	350	BP/708/C	P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C29	.1	450	BP/707/C	P688N-1	DF-104	CUB6P1	GEM-601	6TM-P1	
C30	500			1468-0005	MD-501	5W5T5	MC-245	1FM-35	①

① Value varies. Replace with original value.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	FERROGRAPH PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500K	½	BP/2411/P	AB-60	A47-500K-Z	Q13-133	U48	Gain
B	Shaft			AK-9	RS-2	Not Req.	Not Req.	
R2A	500K	½	BP/2411/P	AB-60	A47-500K-Z	Q13-133	U48	Treble
B	Shaft			AK-9	RS-2	Not Req.	Not Req.	
R3A	500K	½	BP/2411/P	AB-60	A47-500K-Z	Q13-133	U48	Bass
B	Shaft			AK-9	RS-2	Not Req.	Not Req.	

CONTROLS (cont)

ITEM No.	RATING RESISTANCE	RATING WATTS	FERROGRAPH PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R4A	3000Ω	2 (WW)	BP/2401/P	WN-302 †	A43-3000 †	WPS3000 †	R300L †	Meter Adjust
B	Shaft			Not Req.	FKS-1/4	Not Req.	Not Req.	
R5A	3000Ω	2 (WW)	BP/2401/P	WN-302	A43-3000	WPS3000	R300L	Tone Equalizer
B	Shaft			Not Req.	FKS-1/4	Not Req.	Not Req.	
R6A	3000Ω	2 (WW)	BP/2401/P	WN-302	A43-3000	WPS3000	R300L	Tone Equalizer
B	Shaft			Not Req.	FKS-1/4	Not Req.	Not Req.	
R7A	3000Ω	2 (WW)	BP/2401/P	WN-302	A43-3000	WPS3000	R300L	Erase Bias Adjust
B	Shaft			Not Req.	FKS-1/4	Not Req.		

† If a knob is desired in this application, use an extra mounting nut behind mounting surface and use set screw type knob.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	FERROGRAPH PART No.	NOTES
R8	100K 5%		BP/2850/R	
R9	270K 5%		BP/2855/R	
R10	1500Ω 5%		BP/2823/R	
R11	100K 5%		BP/2851/R	
R12	150K 5%			Note 1
R13	4700Ω		BP/2831/R	
R14	150K		BP/2853/R	
R15	1meg		BP/2863/R	
R16	100K 5%		BP/2850/R	
R17	270K 5%		BP/2855/R	
R18	1500Ω 5%		BP/2823/R	
R19	100K		BP/2852/R	
R20	270K		BP/2855/R	
R21	1500Ω 5%		BP/2823/R	
R22	47K			
R23	47K		BP/2849/R	
R24	470K		BP/2861/R	
R25	22K		BP/2843/R	

ITEM No.	RATING OHMS	RATING WATT	FERROGRAPH PART No.	NOTES
R26	220Ω	1	BP/2807/R	
R27	13K 5%			Note 1
R28	15Ω	1	BP/2801/R	
R29	100K 5%		BP/2852/R	
R30	33K		BP/2845/R	
R31	2.2meg5%		BP/2864/R	
R32	200K 5%			Note 1
R33	470K		BP/2861/R	
R34	4700Ω		BP/2831/R	
R35	15K		BP/2842/R	
R36	22K		BP/2843/R	
R37	47K		BP/2849/R	
R38	6800Ω 5%			Note 1
R39	Note 3		BP/5002/T	Note 2
R40	1500Ω		BP/2824/R	
R41	220Ω	1	BP/2807/R	
R42	250Ω	27	BP/2808/R	Note 3

Note 1. Value varies. Replace with original value.
Note 2. Temperature compensating resistor.
Note 3. Some versions may use 1200Ω 27W in this application (Part #BP/2819/R).

COILS (RF-IF)

ITEM No.	USE	FERROGRAPH PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	NOTES
L1	Bias Osc.	726					
L2	Trap Coil	666					
L3	Tone Choke	727					Speed Compensating

FILTER CHOKE

ITEM No.	RATINGS CURRENT (Measured)	RATINGS DC RES.	RATINGS INDUCTANCE (0 CURRENT 1000 ∿)	FERROGRAPH PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L4	.050A	275Ω	10HY	T1551	C5013①			C-1709①	20C84 ①	C-7X ①

① Drill new mounting hole.

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	FERROGRAPH PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	127V Taps @ 120V, 110V 117V@.41A	520VCT @ .050A	5V @.58A	T1552A ①						
	SEC. 3	SEC. 4	SEC. 5							
	6.3VCT @2.2A									

① Alternate Part #T1552B.

FOLDER 5

FERROGRAPH MODEL 3 A/N

ELECT. PARTS LIST AND DESCRIPTIONS (Cont)

TRANSFORMER (DRIVER)

ITEM No.	TURNS RATIO		REPLACEMENT DATA						NOTES
	PRI.	SEC.	FERROGRAPH PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	1	: 6	977/965						

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	FERROGRAPH PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T3	5000Ω	14Ω Tap ⓐ 2Ω	T1428	Z1109 ①	A-2902①	AU-604①	A-3849①	24S64①	S-53X ①	① Drill new mounting holes

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	FERROGRAPH PART No.	QUAM PART No.	
SP1	6"x10"	PM	14Ω	BP/4157/S		

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			FERROGRAPH PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG	2A 250V	BP/1253/F①		312002. (3AG-2A 250V)	342001	AGC2	HKP

① Some versions may use a 1 amp fuse Part #BP/1252/F.

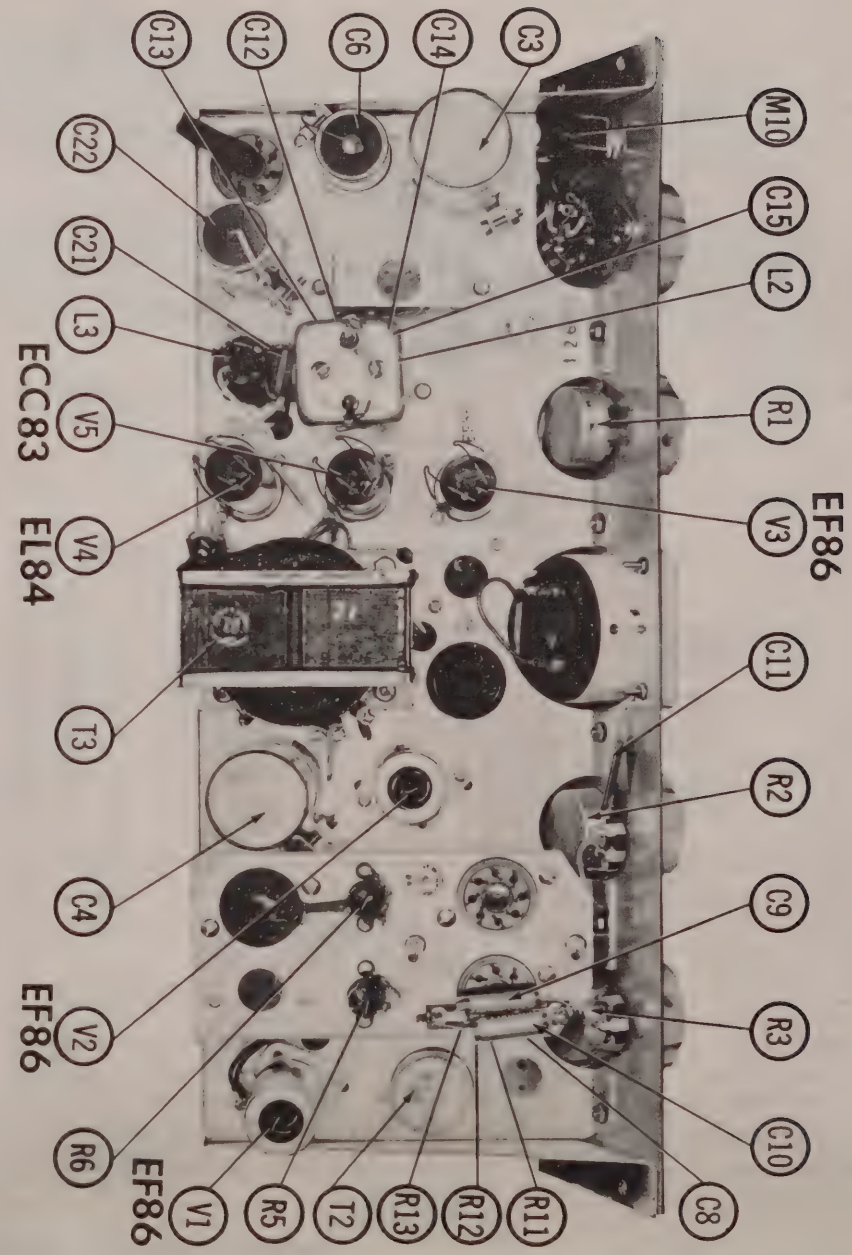
MISCELLANEOUS

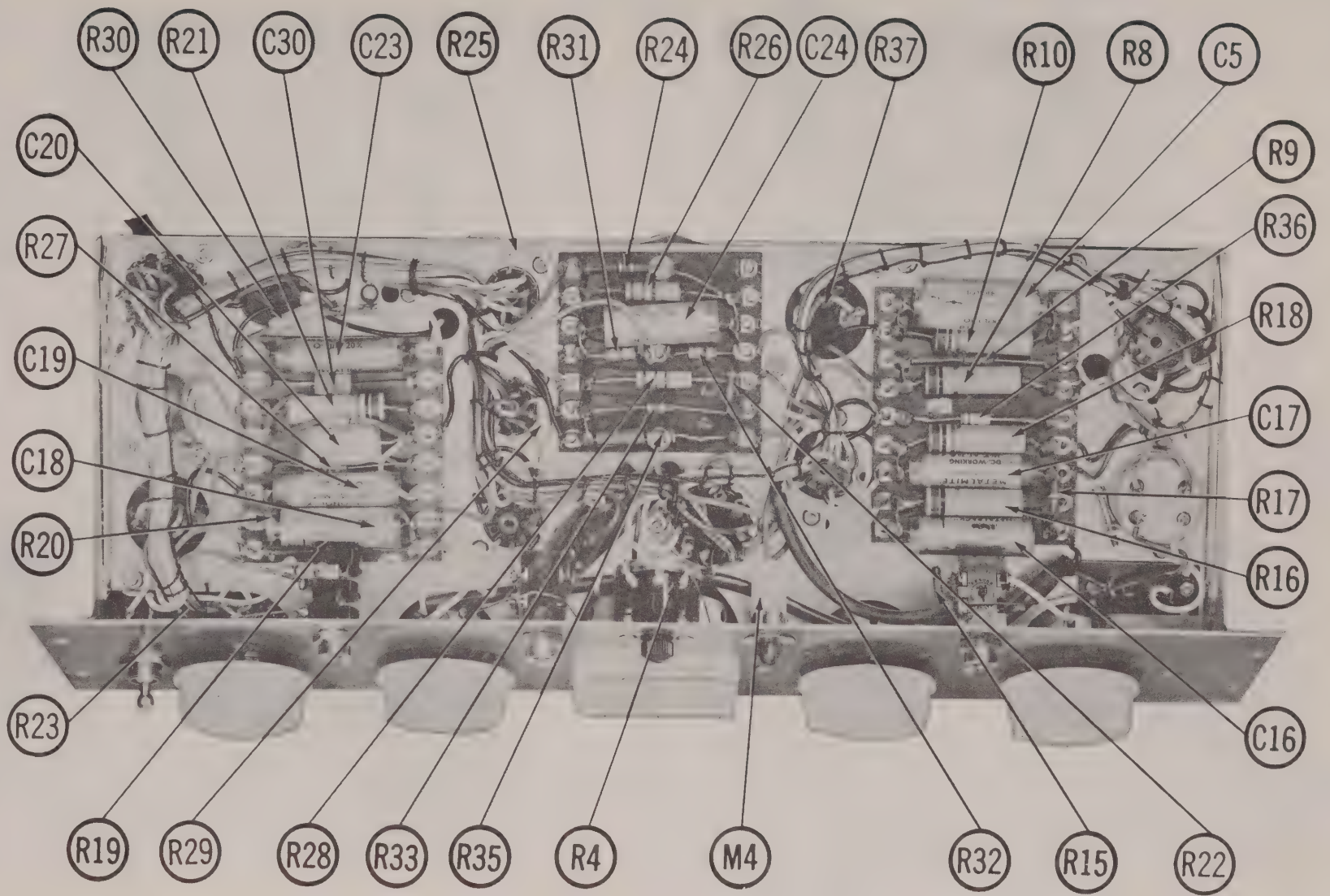
ITEM No.	PART NAME	FERROGRAPH PART No.	NOTES
M2	Erase Head	DNA1218	
M3	Record-Playback Head	DNA1217	
M4	Lamp	BP/1810/L	Neon Type
M5	Switch	DN1755	Playback, Wind-On, Wind-Back, Record (Rotary Wafer Type)
M6	Switch	DN2228	Speed Selector (Rotary Wafer Type)
M7	Switch	DNA1216B	Motor Start Switch (Lever, Spring Return Type)
M8	Switch	DNA1216A	Automatic Solenoid Control (Lever, Spring Return Type)
M9	Switch	DNA1216C	Manual Stop Switch Press to Stop (Lever, Spring Return Type)
M10	Switch	BP/4055/S	Power On-Off (SPST Toggle Type)
M11	Switch	BP/4052/S	Selector (Voltage Selector)
M12	Meter	BP/1926/M	Level, Black
	Meter	BP/1927/M	Level, Cream
M13	Solenoid	T1404	
M14	Rewind Motor	DNA1319A	Early Production
	Rewind Motor	DNA1395A	Late Production
M15	Capstan Motor	DNA1323	Early Production
	Capstan Motor	DNA1394	Late Production
M16	Take-up Motor	DNA1319B	Early Production
	Take-up Motor	DNA1395B	Late Production

WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord	Use BELDEN No. 1765-B (6 Ft. Length) 1725-K (7½ Ft. Length)
Low-Loss Shielded Lead (Interconnecting)	Use BELDEN No. 8401
Phono Pick-up Arm Cable	Use BELDEN No. 8430 (Two Conductor - Twisted)

CHASSIS—TOP VIEW





ELECTRICAL CHASSIS - BOTTOM VIEW

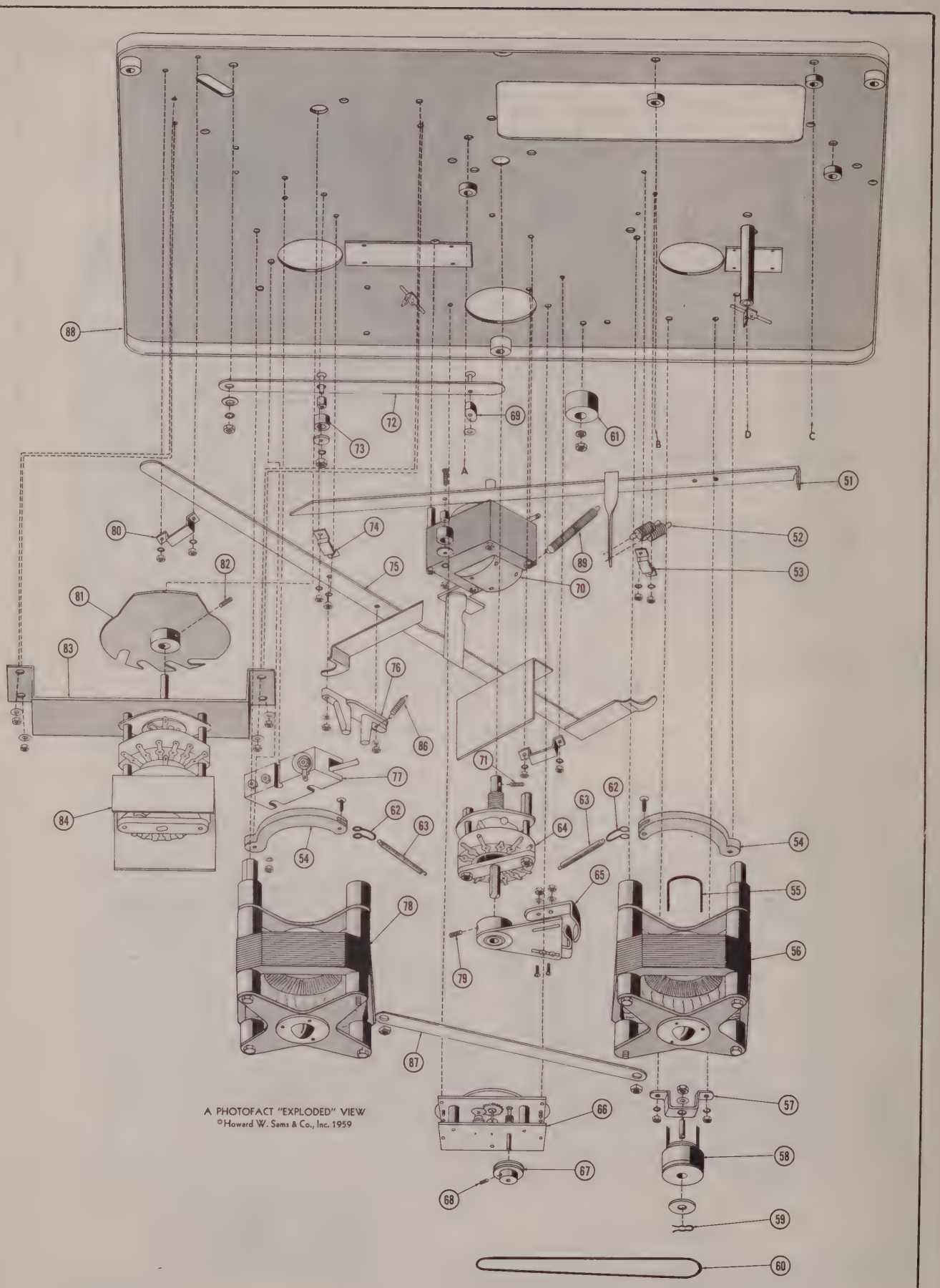
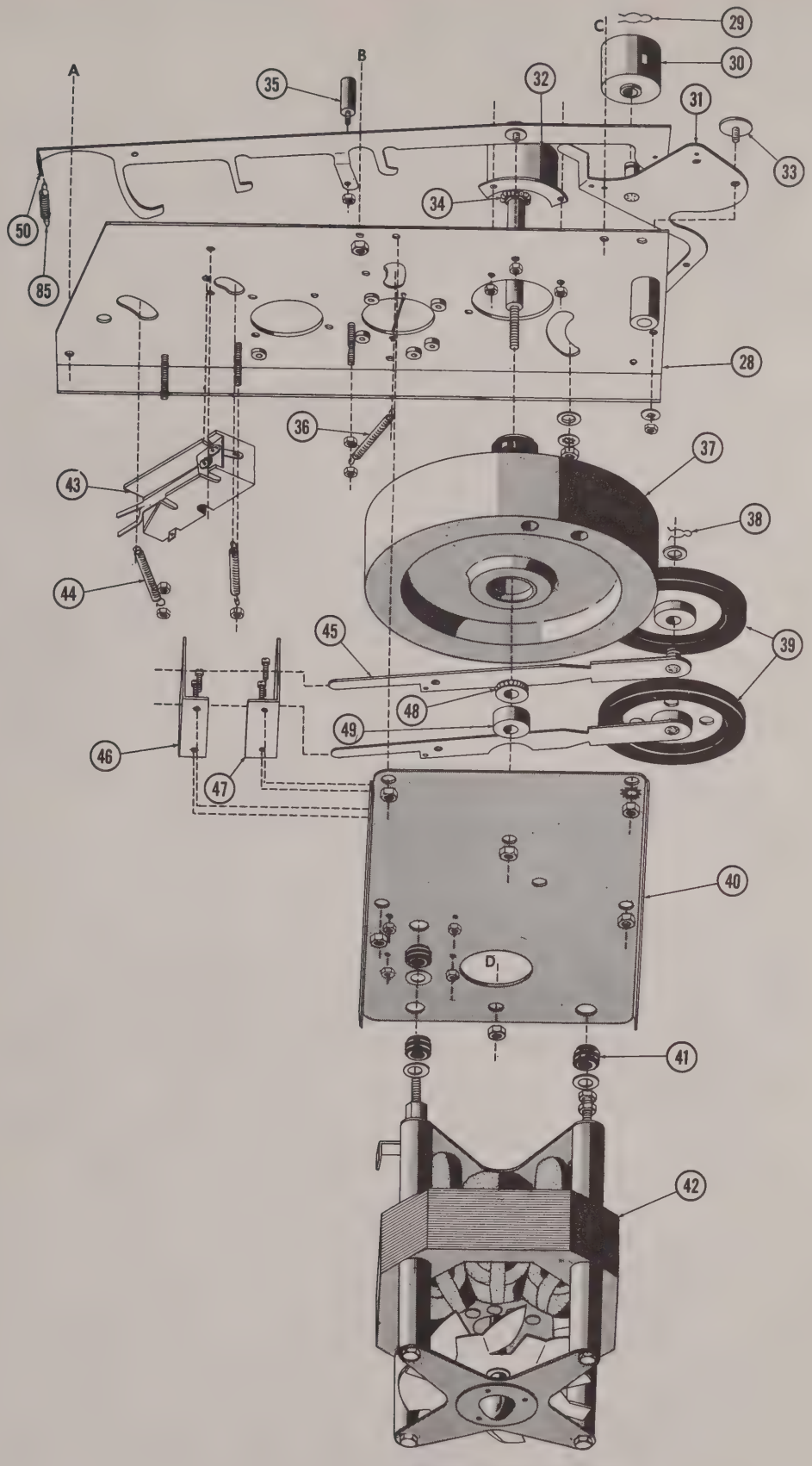


FIG. 5A EXPLODED VIEW OF PARTS BELOW DECK PLATE



A PHOTOFACT "EXPLODED" VIEW
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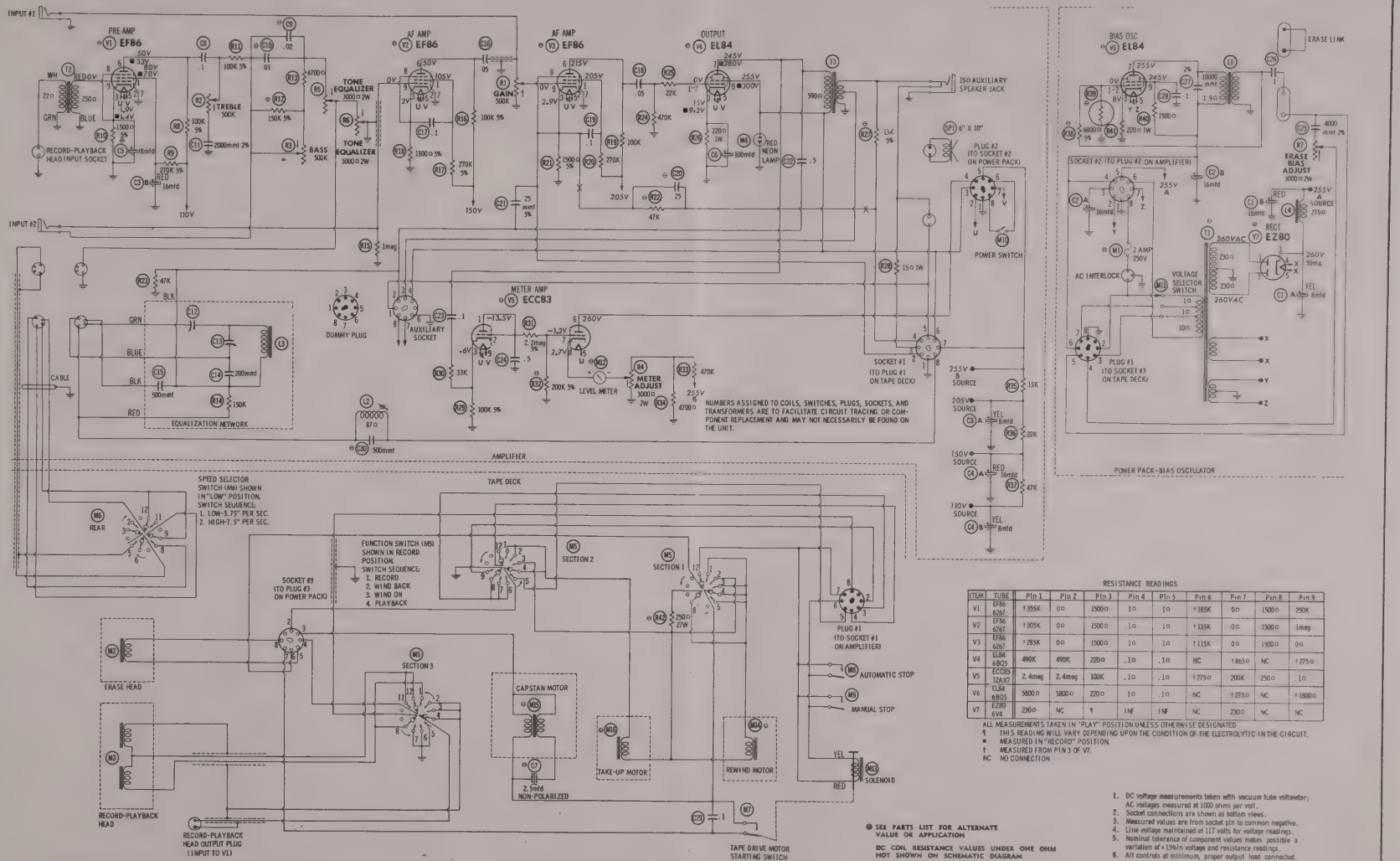
FIG. 5B EXPLODED VIEW OF DRIVE MOTOR ASSEMBLY


INPUT #1
INPUT #2
PRE AMP V1 EF86
AF AMP V2 EF86
AF AMP V3 EF86
OUTPUT V4 EL84
BIAS OSC V6 EL84
METER AMP V5 ECC83
RECTIFIER V7 EZ80
TONE EQUALIZER 3000Ω 2W
TREBLE 500K
BASS 500K
GAIN 500K
METER ADJUST 3000Ω 2W
ERASE BIAS ADJUST 3000Ω 2W
RECORD-PLAYBACK HEAD INPUT SOCKET
DUMMY PLUG
AUXILIARY SOCKET
EQUALIZATION NETWORK
LEVEL METER
15Ω AUXILIARY SPEAKER JACK
PLUG #2 (TO SOCKET #2 ON POWER PACK)
POWER SWITCH
SOCKET #1 (TO PLUG #1 ON TAPE DECK)
SOCKET #2 (TO PLUG #2 ON AMPLIFIER)
PLUG #3 (TO SOCKET #3 ON TAPE DECK)
AC INTERLOCK
VOLTAGE SELECTOR SWITCH
ERASE LINK
NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.
AMPLIFIER
POWER PACK–BIAS OSCILLATOR
TAPE DECK
SPEED SELECTOR SWITCH (M6) SHOWN IN "LOW" POSITION. SWITCH SEQUENCE: 1. LOW-3.75" PER SEC. 2. HIGH-7.5" PER SEC.
FUNCTION SWITCH (M5) SHOWN IN RECORD POSITION. SWITCH SEQUENCE: 1. RECORD 2. WIND BACK 3. WIND ON 4. PLAYBACK
SECTION 1
SECTION 2
SECTION 3
SOCKET #3 (TO PLUG #3 ON POWER PACK)
PLUG #1 (TO SOCKET #1 ON AMPLIFIER)
ERASE HEAD
RECORD-PLAYBACK HEAD
RECORD-PLAYBACK HEAD OUTPUT PLUG (INPUT TO V1)
CAPSTAN MOTOR
TAKE-UP MOTOR
REWIND MOTOR
AUTOMATIC STOP
MANUAL STOP
SOLENOID
TAPE DRIVE MOTOR STARTING SWITCH
2.5mfd NON-POLARIZED
CABLE
REAR

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	EF86 6267	†355K	0Ω	1500Ω	1Ω	1Ω	†185K	0Ω	1500Ω	250K
V2	EF86 6267	†305K	0Ω	1500Ω	.1Ω	1Ω	†135K	0Ω	1500Ω	1meg
V3	EF86 6267	†285K	0Ω	1500Ω	1Ω	1Ω	†115K	0Ω	1500Ω	0Ω
V4	EL84 6BQ5	490K	490K	220Ω	.1Ω	.1Ω	NC	†865Ω	NC	†275Ω
V5	ECC83 12AX7	2.4meg	2.4meg	100K	.1Ω	.1Ω	†275Ω	200K	250Ω	.1Ω
V6	EL84 6BQ5	5800Ω	5800Ω	220Ω	1Ω	.1Ω	NC	†275Ω	NC	†1800Ω
V7	EZ80 6V4	230Ω	NC	¶	INF	INF	NC	230Ω	NC	NC

ALL MEASUREMENTS TAKEN IN "PLAY" POSITION UNLESS OTHERWISE DESIGNATED
¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
■ MEASURED IN "RECORD" POSITION.
† MEASURED FROM PIN 3 OF V7.
NC NO CONNECTION

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

● SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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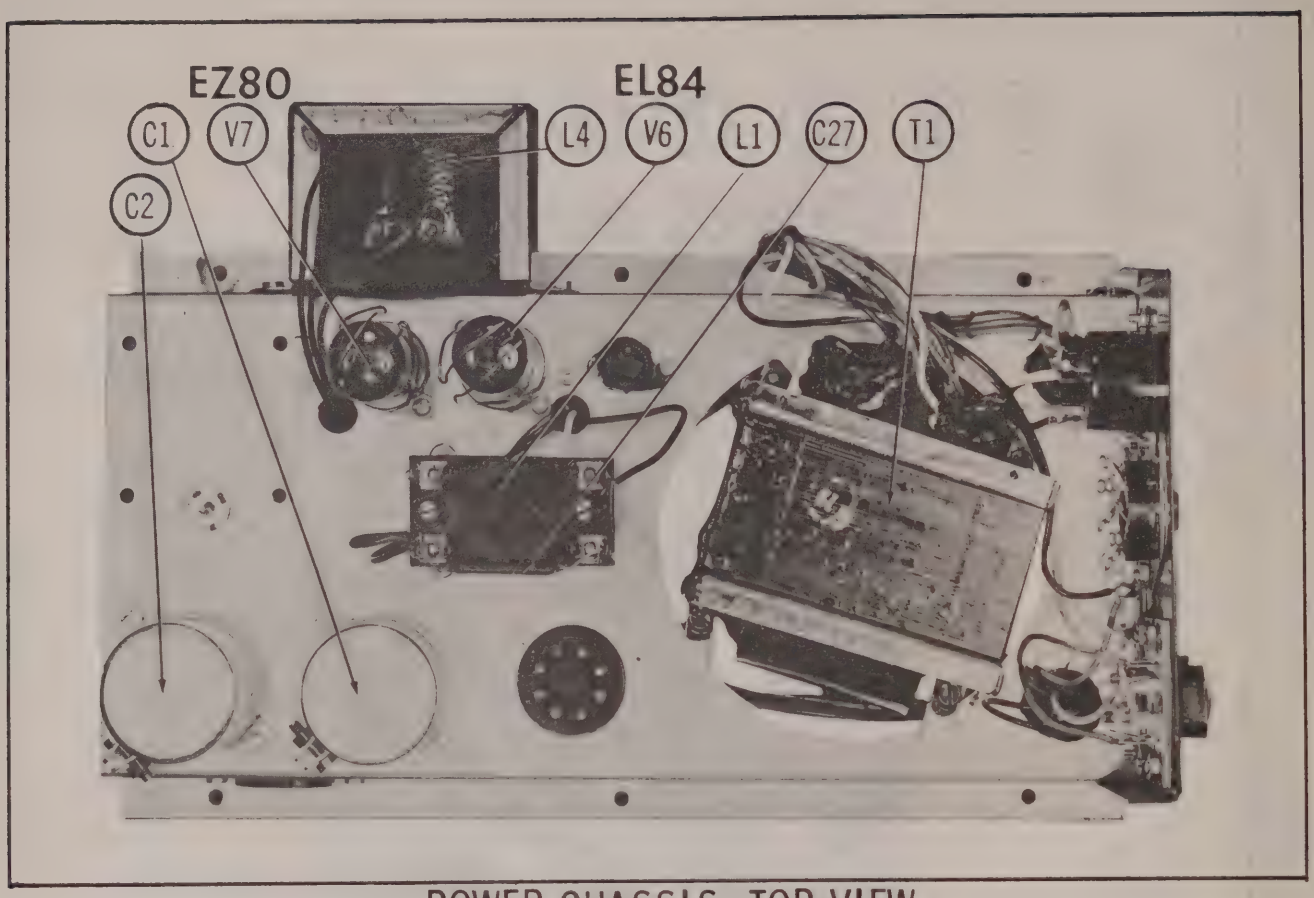
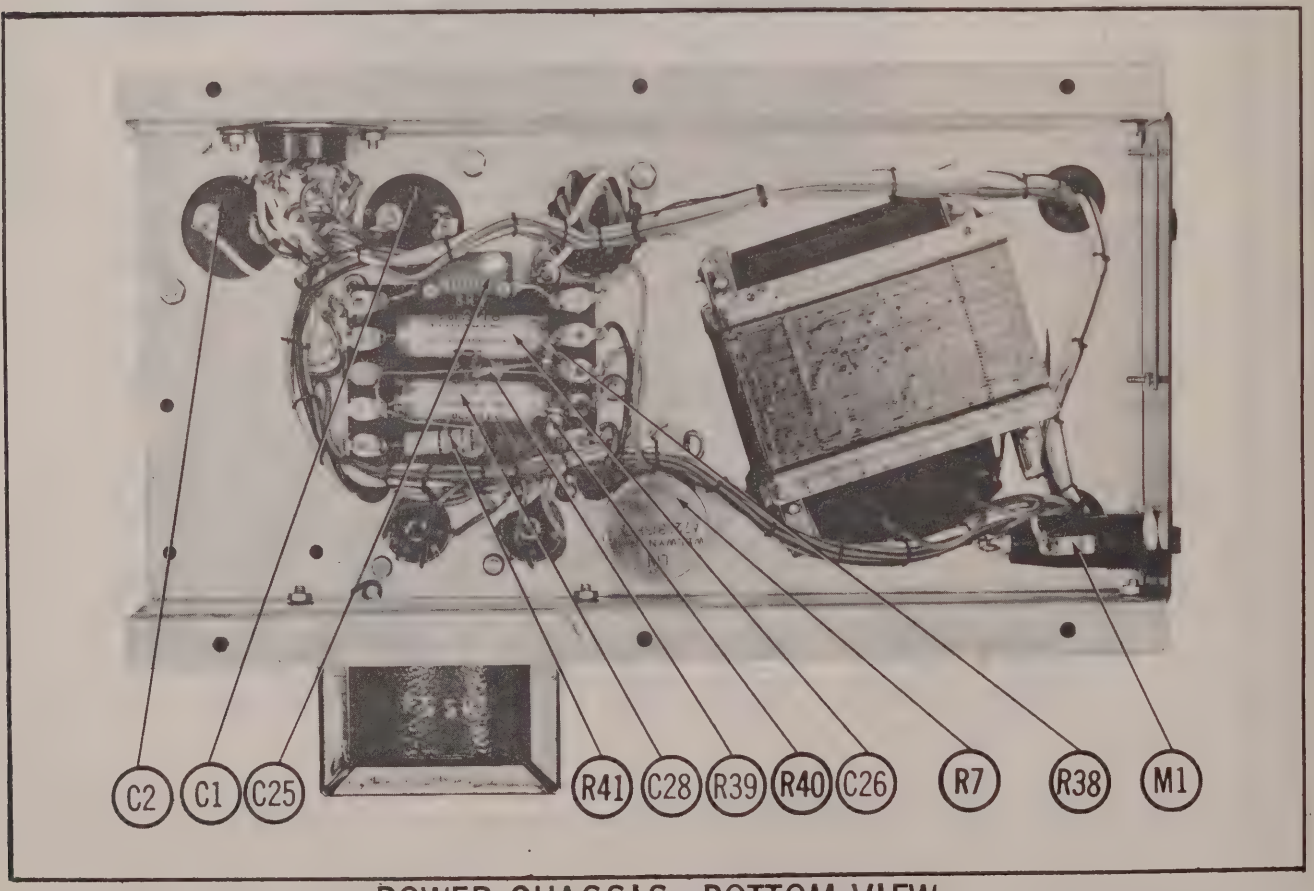
FERROGRAPH MODEL 3 A/N



POWER CHASSIS - TOP VIEW



POWER CHASSIS - BOTTOM VIEW

PHOTOFACT* Folder with CIRCUITRACE*

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

GENERAL ELECTRIC MODELS T120A, B

GENERAL ELECTRIC
MODELS T120A, B

MODEL T120A

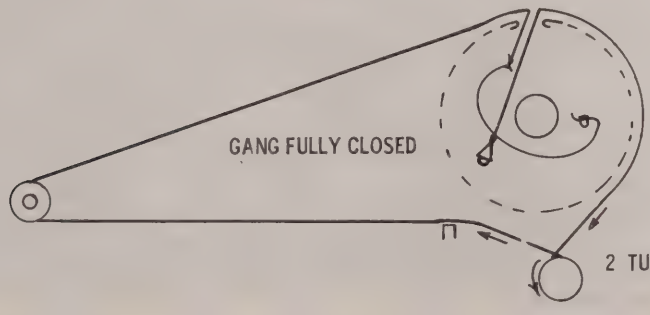
GENERAL ELECTRIC
MODELS T120A, B

TRADE NAME	General Electric Models T120A, T120B		
MANUFACTURER	General Electric Co., Products Service, Radio Receiver Dept., 869 Broad St., Utica, N. Y.		
TYPE SET	AC-DC Operated FM-AM Receiver		
TUBES	Eight		
POWER SUPPLY	105-120 Volts AC, 60 Cycles	RATING	26 Watts, .30 Amp. @ 117 Volts AC
TUNING RANGE	BROADCAST 540 - 1600KC	FREQ. MOD.	88 - 108MC

DISASSEMBLY

1. Remove two screws from rear of cabinet.
2. Separate front and back sections of cabinet. Chassis remains fastened to cabinet front.
3. If necessary, knobs are removed by releasing captive clips with screwdriver.

DIAL CORD STRINGING



HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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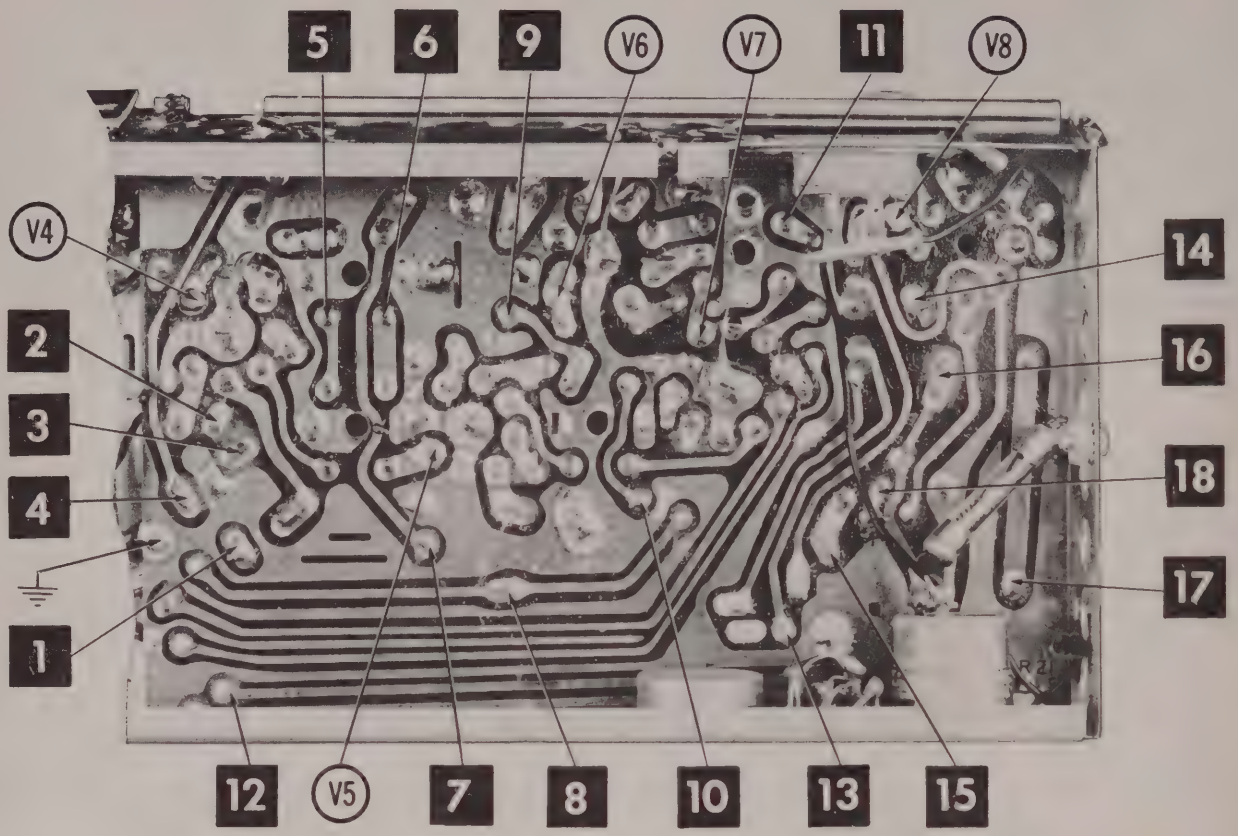
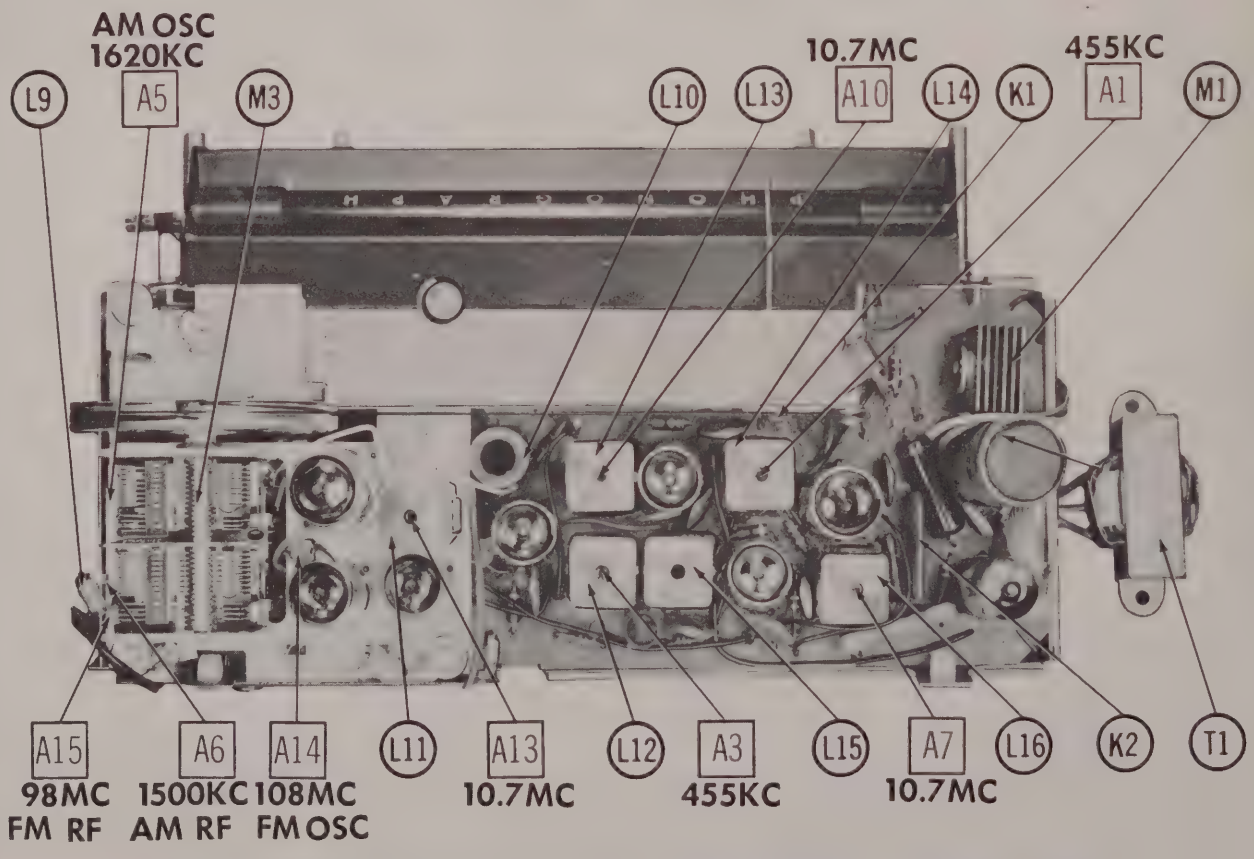
H934



A Howard W. Sams CIRCUITRACE® Photo

PRINTED BOARD

ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED



CHASSIS TOP VIEW - ALIGN, INDUCTOR, & MISC IDENT

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer, if available. If not, connect a .1mfd capacitor in series with low side of signal generator and chassis.
Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.
Suggested Alignment Tools: A1 thru A4, A7 thru A13..... GENERAL CEMENT #8606, 8606L, 8282, 9091
WALSCO #2526, 2541, 2542, 2543, 2544
A5, A6, A15..... GENERAL CEMENT #5000, 5003, 5009, 8276, 8290
WALSCO #2515, 2520, 2523, 2525, 2537
A14..... GENERAL CEMENT #5009, 8271, 8275, 8276, 8721, 8722, 9150, 9298
WALSCO #2516, 2519

AM ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.05mfd	High side to pin 1 (grid) of 12AU6 (V4). Low side to chassis.	455KC (400∿ Mod.)	AM	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output.
2.		Loop	1620KC	"	"	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		"	1500KC	"	Tune to 1500KC signal	"	A6	"

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
4.	.05mfd	High side to FM RF stator lug of tuning gang. Low side to chassis.	10.7MC (Unmod.)	FM	Point of non-interference	DC probe thru 1meg to point Ⓐ. Common to chassis.	A9, A10, A11, A12, A13	Adjust for maximum deflection.
5.	"	"	"	"	"	DC probe thru 1meg to point Ⓑ. Common to chassis.	A8	"
6.	270Ω Carbon Resistor	High side to right FM antenna terminal. Low side to left FM ant. term.	"	"	"	DC probe to point Ⓒ. Common to chassis.	A7	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
4.	.05mfd	High side to FM RF stator lug of tuning gang. Low side to chassis.	10.7MC (450KC Swp.)	FM	Point of non-interference	Vert. Amp. thru 27K to point Ⓐ. Low side to chassis.	A9, A10, A11, A12, A13	Adjust for maximum amplitude and symmetry similar to Fig. 1.
5.	"	"	"	"	"	Vert. Amp. thru 27K to point Ⓑ. Low side to chassis.	A8	"
6.	270Ω Carbon Resistor	High side to right FM antenna terminal. Low side to left FM ant. term.	"	"	"	Vert. Amp. to point Ⓒ. Low side to chassis.	A7	Adjust so that 10.7MC occurs at center of crossover lines similar to Fig. 2. SLIGHTLY retouch A8 for maximum amplitude and straightness of crossover lines.

FM RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
7.	270Ω Carbon Resistor	High side to right FM antenna terminal. Low side to left terminal.	108MC (Unmod.)	FM	Tuning gang fully open	DC probe to point Ⓐ. Common to chassis.	A14	Adjust for maximum deflection.
8.	"	"	98MC	"	Tune to 98MC signal	"	A15	"
	Step 9 is not necessary unless receiver fails to track properly.							
9.	270Ω Carbon Resistor	High side to right FM antenna terminal. Low side to left terminal.	88MC	FM	88MC	DC probe to point Ⓐ. Common to chassis.	L5	Adjust for maximum deflection by compressing or expanding coil turns while rocking tuning gang. Repeat steps 8 & 9.

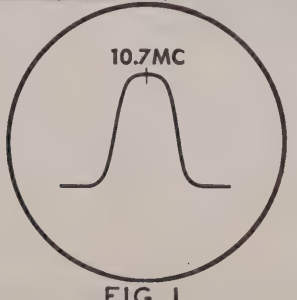


FIG. 1

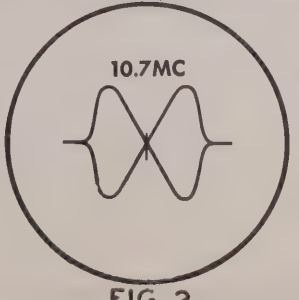
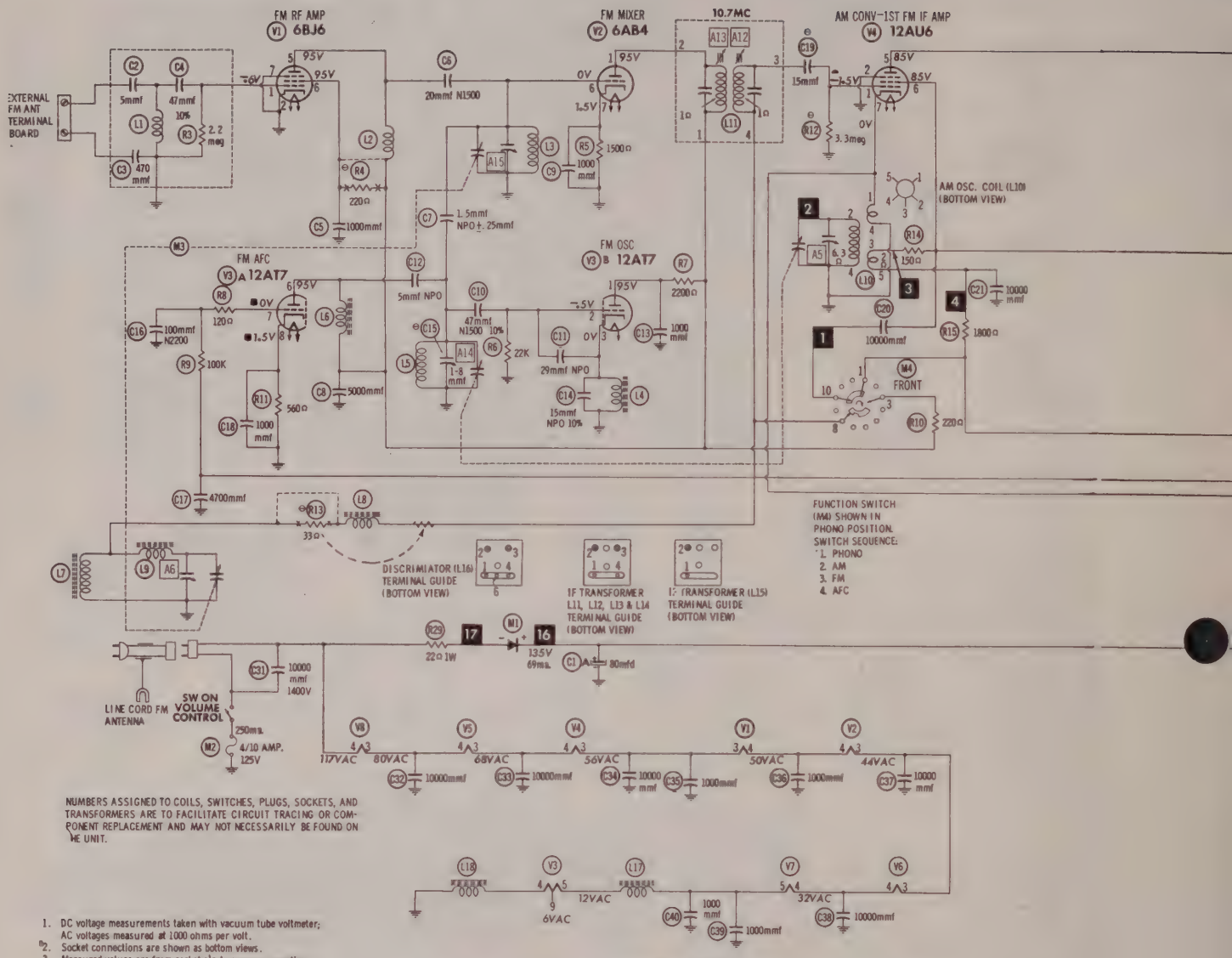


FIG. 2



NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

❶ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6BJ6	2.2meg	0Ω	55Ω	49Ω	†1200Ω	†1400Ω	0Ω		
V2	6AB4	†1200Ω	NC	43Ω	49Ω	NC	0Ω	1500Ω		
V3	12AT7	†3400Ω	22K	0Ω	0Ω	12Ω	†1200Ω	100K	560Ω	6Ω
V4	12AU6	3.3meg	0Ω	55Ω	67Ω	†2800Ω	†2800Ω	0Ω		
V5	12BA6	2.7meg	0Ω	67Ω	79Ω	†1700Ω	†1700Ω	68Ω		
V6	12AU6	100K	0Ω	43Ω	31Ω	†16K	†16K	180Ω		
V7	19T8	100K	100K	180K	31Ω	12Ω	▪450K	0Ω	6.8meg	†470K
V8	35C5	150Ω	470K	79Ω	114Ω	470K	†1000Ω	†287Ω		

ALL MEASUREMENTS TAKEN IN "FM" POSITION UNLESS OTHERWISE DESIGNATED.
▫ MEASURED IN "AM" POSITION.
† MEASURED FROM OUTPUT OF M1.
▪ MEASURED IN "FM-AFC" POSITION.

A PHOTOFACT STANDARD NOTATION SCHEMATIC with CIRCUITRACE

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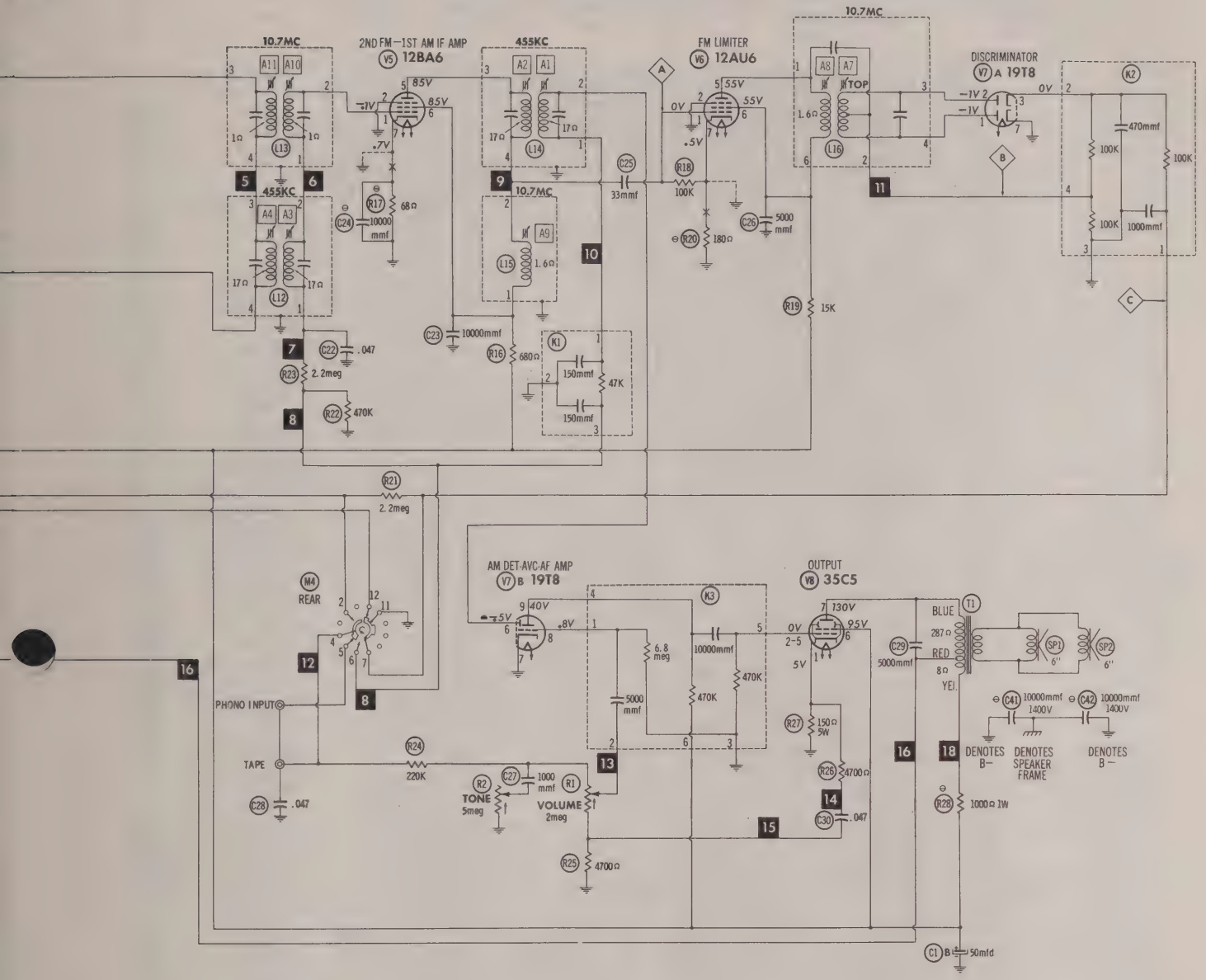
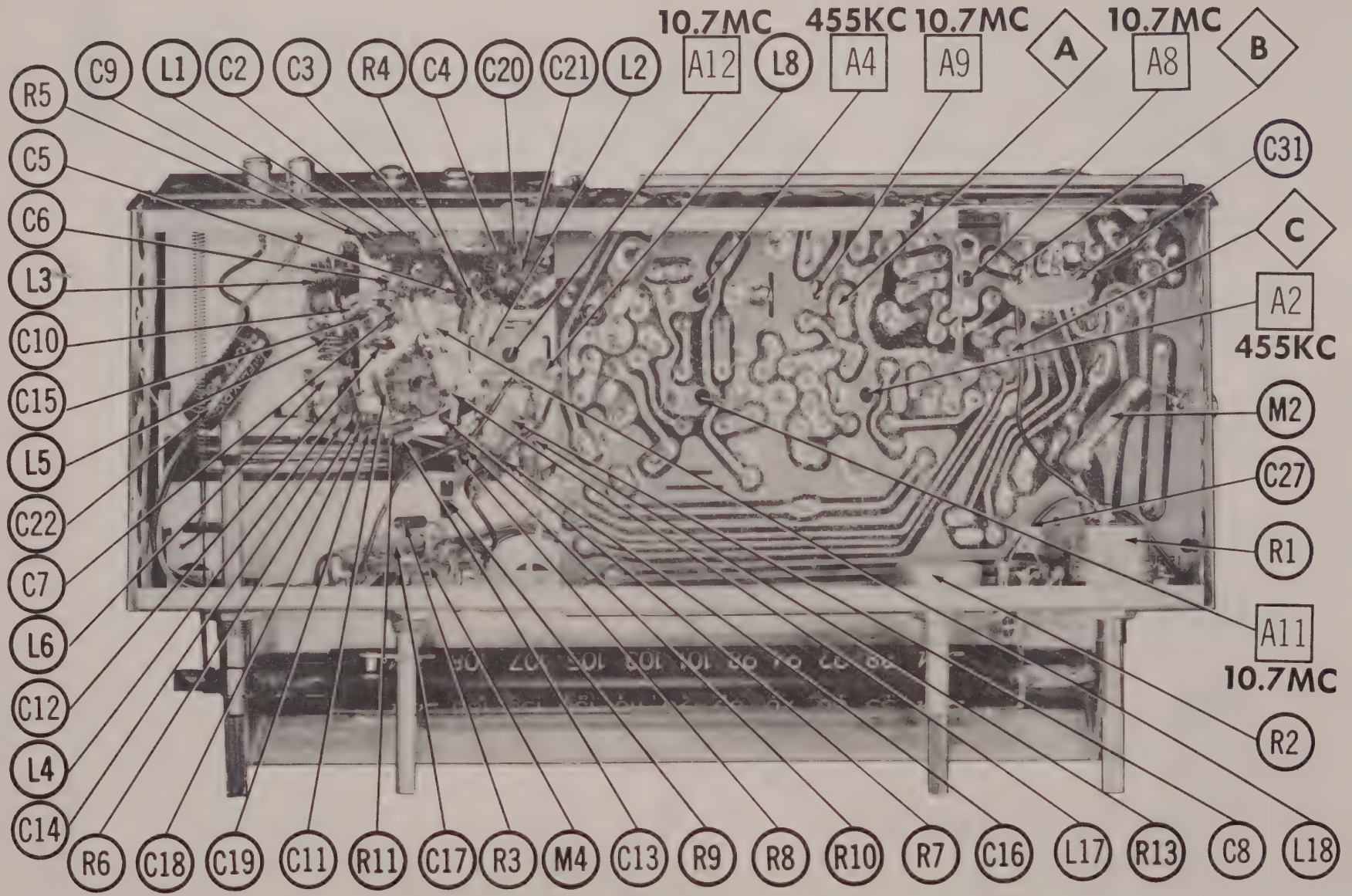


GENERAL ELECTRIC
MODELS T120A, B



CHASSIS TOP VIEW

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	FM RF Amplifier	6BJ6	
V2	FM Mixer	6AB4	
V3	FM Osc. - FM AFC	12AT7	
V4	AM Conv. - 1st FM IF Amplifier	12AU6	
V5	2nd FM - 1st AM IF Amp.	12BA6	
V6	FM Limiter	12AU6	
V7	Discriminator - AM Det. - AVC - AF Amplifier	19T8	
V8	Output	35C5	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA G. E. PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	80	150	RS-1325	PRS150V8050	BBRD8515	TCD498	TDLD-12	VLS-2462 *	
B	50	150							

* Not normally in distributors stock. Available thru distributor on order to manufacturer.

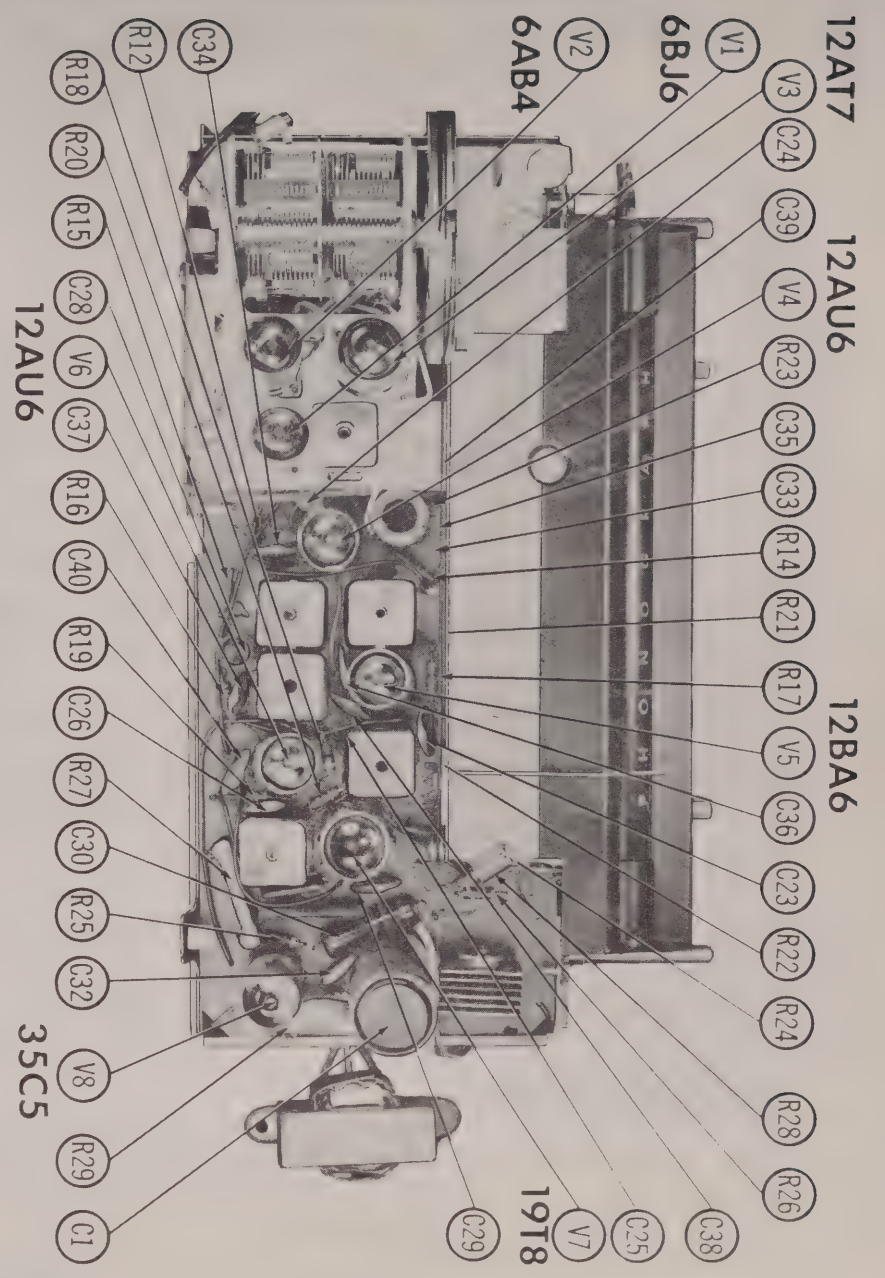
FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	RATING TOL	REPLACEMENT DATA G. E. PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C2	5	1000		RS-1296		DD-050	L10V5		5GA-V5	
C3	470	1000		RS-1301	HVD-15-470	DD-471	L10T47	B-347	5GA-T47	
C4	47		10%	RS-1302	DI 47	DD-470	L10Q47	CNO-447	5GA-Q47	
C5	1000				SI 1000	D6-102	LT6D1	UC-521	5HK-D1	
C6	20		N1500	RS-1299						
C7	1.5		NPO±.25mmf	RS-1298		DTZ-1R5		CNO-515	5TCCB-V15	
C8	5000			RS-1023	BPD-005	DD-502	BYA10D5	B-250	5HK-D5	
C9	1000			RS-1051	BPD-001	DD-102	BYA6D1	B-210	5HK-D1	
C10	47		N1500 10%	RS-1302						
C11	29		NPO	RS-1327						
C12	5		NPO	RS-1297	NPO-DI 5	TCZ-4R7	C10V5C	CNO-547	5TCCB-V47	
C13	1000			RS-1051	BPD-001	DD-102	BYA6D1	B-210	5HK-D1	
C14	15		NPO 10%	RS-1305	NPO-DI 15	DTZ-15	C10Q15C	CNO-415	5TCC-Q15	
C15	1-8			RS-1387						①
C16	100		N2200	RS-1303						
C17	4700				BPD-0047	DD-472	BYA10D47M	B-247	5HK-D47	
C18	1000			RS-1051	BPD-001	DD-102	BYA6D1	B-210	5HK-D1	
C19	15			RS-1305	DI 15	DD-150	L10Q15	CNO-415	5GA-Q15	②
C20	10000				BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C21	10000				BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C22	.047	200			P288N-047	DF-503	BC2S47J	ACE6147	2SE-S47	
C23	10000				BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C24	10000				BPD-01	DD-103	BYA10S1	B-110	5HK-S1	③
C25	33				DI 33	DD-330	L10Q33	CNO-433	5GA-Q33	
C26	5000			RS-1023	BPD-005	DD-502	BYA10D5	B-250	5HK-D5	
C27	1000			RS-1051	BPD-001	DD-102	BYA6D1	B-210	5HK-D1	
C28	.047	400			P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	
C29	5000			RS-1023	BPD-005	DD-502	BYA10D5	B-250	5HK-D5	
C30	.047	400			P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	
C31	10000	1400			DAC-27	DD16-103	HVE16S1	2HV-110	BL-S10	
C32	10000				BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C33	10000				BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C34	10000				BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C35	1000			RS-1051	BPD-001	DD-102	BYA6D1	B-210	5HK-D1	
C36	1000			RS-1051	BPD-001	DD-102	BYA6D1	B-210	5HK-D1	
C37	10000				BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C38	10000				BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C39	1000			RS-1051	BPD-001	DD-102	BYA6D1	B-210	5HK-D1	
C40	1000			RS-1051	BPD-001	DD-102	BYA6D1	B-210	5HK-D1	
C41	10000	1400			DAC-27	DD16-103	HVE16S1	2HV-110	BL-S10	④
C42	10000	1400			DAC-27	DD16-103	HVE16S1	2HV-110	BL-S10	④

① Model T120B uses 1.5mmf in this application.
② Value may vary from 15 to 33mmf. Replace with original value.
③ May not be used in some versions.
④ Some versions may use 5000mmf in this application.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	G. E. PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	2meg	½	RS-1279				PP-26A	Volume
B	Switch						Not Req.	Push-Pull Type
R2A	5meg	½	RS-1280	B-88	A47-5meg-Z	Q13-141	U65	Tone
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		G. E. PART No.	NOTES
	OHMS	WATT		
R3	2.2meg			
R4	220Ω			Note 1
R5	1500Ω			
R6	22K			
R7	2200Ω			
R8	120Ω			
R9	100K			
R10	220Ω			
R11	560Ω			
R12	3.3meg			Note 2
R13	33Ω			Note 1
R14	150Ω			
R15	1800Ω			
R16	680Ω			

Note 1. Not used in some versions.
Note 2. Some versions may use 2.2meg in this application.

ITEM No.	RATING		G. E. PART No.	NOTES
	OHMS	WATT		
R17	68Ω			Note 1
R18	100K			
R19	15K			
R20	180Ω			Note 1
R21	2.2meg			
R22	470K			
R23	2.2meg			
R24	220K			
R25	4700Ω			
R26	4700Ω			
R27	150Ω	5	RS-1441	
R28	1000Ω	1		Note 3
R29	22Ω	1	RS-1440	

Note 3. If clamp is not used, increase wattage to 3W.

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					NOTES
		G. E. PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	FM Ant. Coil	RS-1293					1.3 Microhenries
L2	RF Choke	RS-1292					
L3	FM RF Coil	RS-1290					2.9 Microhenries
L4	Cathode Choke	RS-1294					
L5	FM Osc. Coil	RS-1291					2.9 Microhenries
L6	RF Choke	RS-1294					
L7	Loopstick	RS-1322					
L8	RF Choke	RS-1473					2.9 Microhenries
L9	RF Choke	RS-1294					2.9 Microhenries
L10	AM Osc. Coil	RS-1318					
L11	1st FM IF	RS-1289	16-3490		1463-PC		
L12	1st AM IF	RS-1321	16-6780	BC-356	13-PC1	RF-4	
L13	2nd FM IF	RS-1311	16-3490		1463-PC		
L14	2nd AM IF	RS-1313	16-6780	BC-357	13-PC2	RF-4	
L15	3rd FM IF	RS-1312					
L16	Discriminator	RS-1314					
L17	Fil. Choke	RS-1294					2.9 Microhenries
L18	Fil. Choke	RS-1294					2.9 Microhenries

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	G. E. PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2500Ω Tap② 200Ω	1-2Ω	RS-1271							

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	G. E. PART No.	QUAM PART No.	
SP1	6"	PM	3-4Ω	RB-1054 ①	6A15 ①	① Parallel and Phase
SP2	6"	PM	3-4Ω	RB-1054 ①	6A15 ①	

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	G. E. PART No.	REPLACEMENT DATA
K1	Det. RF Filter	150mmf, 150mmf, 47K	RS-1315	Aerovox PA-98 Centralab PC-51 Cornell-Dubilier 111TM2 Sprague D-2
K2	Discriminator Circuit	470mmf, 1000mmf, 100K, 100K, 100K	RS-1316	
K3	Audio Circuit	5000mmf, 10000mmf, 470K, 470K, 6.8meg	RS-1317	

SELENIUM RECTIFIER

ITEM No.	RATING	REPLACEMENT DATA				NOTES
	CURRENT (Measured)	G. E. PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	SARKES TARZIAN PART No.	
M1	.069A	RS-1319	1234AH	RS100 SD-94 ①	100 K200 ①	① Silicon Type

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			G. E. PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M2	3AG	4/10A 125V S/B	RS-1442		315.400 (4/10A 125V S/B)		MDV4/10	

MISCELLANEOUS

ITEM No.	PART NAME	G. E. PART No.	NOTES
M3	Tuning Cap.	RS-1285	4 Gang (AM Sections: Ant. 17-297mmf, Osc. 22-162)
M4	Switch	RS-1281	Function Selector (4 Position, Rotary Wafer Type)
	Printed Board		(Chassis Stamp 595D136R21)

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	RS-1272	Tuning, Volume-On-Off, Includes Clip
Knob	RS-1273	Function Selector, Includes Clip
Knob	RS-1399	Tone, Includes Clip
Pointer Ass'y.	RS-1283	
Crystal	RS-1268	

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

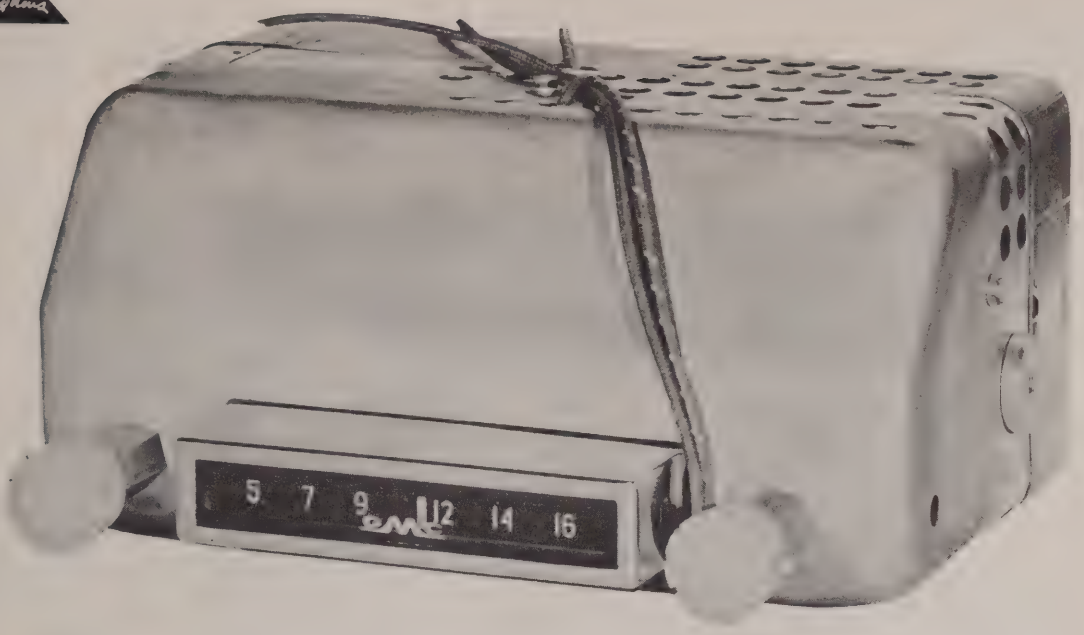
Power Cord (Interlock Type) ..... Use BELDEN No. 8674

PHOTOFACT* Folder

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

GMC MODEL 2233398

GMC MODEL 2233398



TRADE NAME	GMC Model 2233398 (For All GMC 12V Trucks)
MANUFACTURER	Delco Radio, Div. of G. M. Corp., Kokomo, Indiana
TYPE SET	Battery Operated Custom Built AM Automobile Receiver
TUBES (Six)	Types 12BA6 RF Amplifier, 12BE6 Converter, 12BA6 IF Amplifier, 12AV6 Det. -AVC-AF Amp., 12V6GT Output, 0Z4 Rectifier
POWER SUPPLY	12 Volt Storage Battery — RATING 2.4 Amp. @ 12.6 Volts DC
TUNING RANGE—BROADCAST	540-1600KC

GMC MODEL 2233398

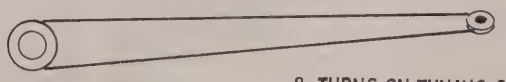
ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1mfd	High side to Pin 7 (grid) of 12BE6 (V2). Low side to chassis.	262KC (400~ Mod.)	High frequency end stop	Across voice coil	A1, A2, A3, A4	Adjust for maximum output.
	Check setting of Osc. Coil Core (A5). Rear of core should be 1 25/32" from mounting end of coil form.						
2.	82mmf	High side to antenna receptacle. Low side to chassis.	1615KC	"	"	A6, A7, A8	Adjust for maximum output.
3.	"	"	1000KC	Tune to 1000KC signal	"	A9, A10	"
4.	"	"	1615KC	High frequency end stop	"	A7, A8	"
5.	With radio tuned to a 900KC signal, slide pointer on dial cord to coincide with 900KC mark on dial.						
	With radio installed in car and antenna fully extended, tune in a weak station between 600KC and 1000KC. Adjust A8 for maximum output.						

DIAL CORD



8 TURNS ON TUNING SHAFT

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of H622R

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SET 438 FOLDER 7

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	RF Amplifier	12BA6	
V2	Converter	12BE6	
V3	IF Amplifier	12BA6	
V4	Det.-AVC-AF Amp.	12AV6	
V5	Output	12V6GT	
V6	Rectifier	0Z4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	DELCO PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	■ 20	400	7262905	AFH2-51	B0400	FP234	TMD-50	D-215	TVL-2755
B	▲ 20	400							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	DELCO PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C2A	7-102		7262799						
B	33								
C3	.05	400	6512	P488N-05	DF-503	CUB4S5	GEM-415	4TM-S5	
C4	.05	400	6512	P488N-05	DF-503	CUB4S5	GEM-415	4TM-S5	
C5A	10		G-100						Note 1
B	39		G-390						
C6A									
B									
C			7242454						
D									
C7	180		7257424						N150
C8	2000		6528	BPD-002	DD-202	BYA10D2	DC522	5HK-D2	
C9	.01	600	6533	P688N-01	D6-103	CUB6S1	GEM-611	6TM-S1	
C10	.01	600	6533	P688N-01	D6-103	CUB6S1	GEM-611	6TM-S1	Note 2
C11	2000		6528	BPD-002	DD-202	BYA10D2	DC522	5HK-D2	Note 3
C12	.006	800	H-602	P1088N-006	DD16-602	CUB10D6	GEM-1028	10TM-D6	
C13	.008	1600	6568	P1688N-008	DD16-802	CUB16D8	GEM-1628	M13-D8	
C14	.1	200	6690	P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	
C15			1217848						

Note 1. Some versions may use 15mmf in this application (Part #6361).
Note 2. Some versions may use .05mfd in this application (Part #6512).
Note 3. Some versions may use 1000mmf in this application (Part #6527).

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	DELCO PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	2meg	½	7264211				♦ QJ-698A	Tone
B	300K Switch	½						Volume

♦ "Concentrikit" Equivalent; K-8 Kit, Base Elements & Shafts: B-13-129, P14-204 Panel, B-13-132, R1-234 Rear, 76-2 Switch

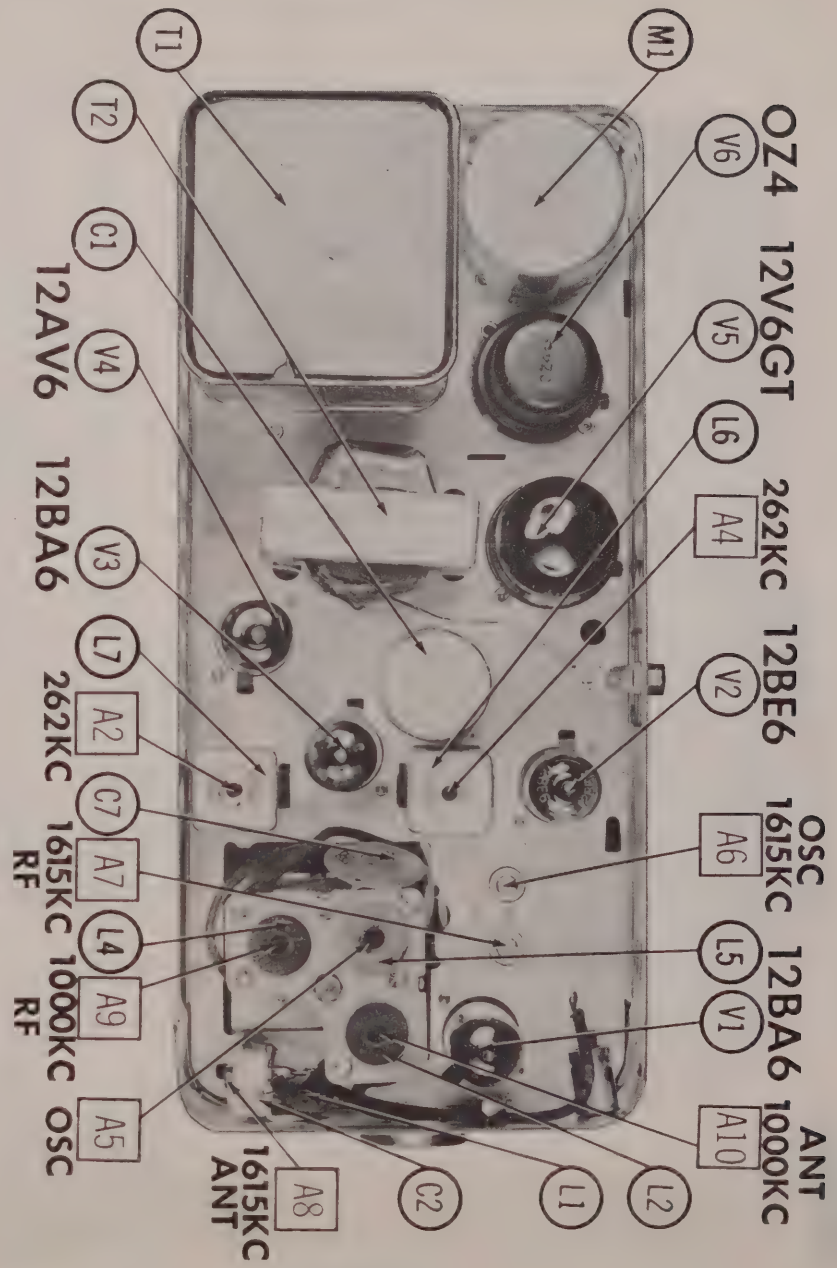
RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	DELCO PART No.	NOTES
R2	2.2meg		A-225	
R3	15K	1	B-153	
R4	15K	2	C-153	
R5	100Ω		A-101	
R6	330K		A-334	
R7	22K		A-223	
R8	150Ω		A-151	
R9	1meg		A-105	
R10	47K		A-473	
R11	6.8meg		1244	
R12	220K		A-224	
R13	220K		A-224	
R14	330Ω	1(WW)	1156	Note 1
R15	15K	1	B-153	
R16	1800	2(WW)		Note 2

Note 1. Some versions may use 390Ω 1W in this application (Part #B-391).
Note 2. Manufacturer recommends replacing with 2700Ω 2W (Part #C-272) and 5600Ω 1W (Part #B-562) connected in parallel.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					
		DELCO PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	NOTES
L1	Ant. Coil	7255738	19-1004	BC-565	4610		6.5 microhenries
L2	Ant. Coil	7258914					
L3	RF Choke	7240251					25 microhenries
L4	RF Coil	7258914					
L5	Osc. Coil	7258911					
L6	Input IF	1218725	16-6752	BC-350	12-H1	RF-3	
L7	Output IF	1218726	16-6754	BC-354	12-H6		
L8	Fil. Choke	1217846					1.4 microhenries

TRANSFORMER (VIBRATOR)

ITEM No.	RATING			REPLACEMENT DATA						
	PRI.	SEC. 1	SEC. 2	DELCO PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	12.6VCT @1.8A	600VCT @.054A		12206064						

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	DELCO PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	6000Ω	3-4Ω	6062	Z1002①	A-3019①		A-3823①	26S49①	S-5Z①	① Use original channel frame.

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	DELCO PART No.	QUAM PART No.	
SP1	6" x 9"	PM	3-4Ω	77264951	6A15	

VIBRATOR

ITEM No.	TYPE	INPUT VOLTS	FREQUENCY	REPLACEMENT DATA				NOTES
				DELCO PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	RADIART PART No.	
M1	Interrupter	12.6 VDC	115∿	8550	6330	G-874	6330	

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			DELCO PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M2		7½A. 32V	7263227	1220177				

MISCELLANEOUS

ITEM No.	PART NAME	DELCO PART No.	NOTES
M3 M4	Lamp Spark Plate	1221226	#57

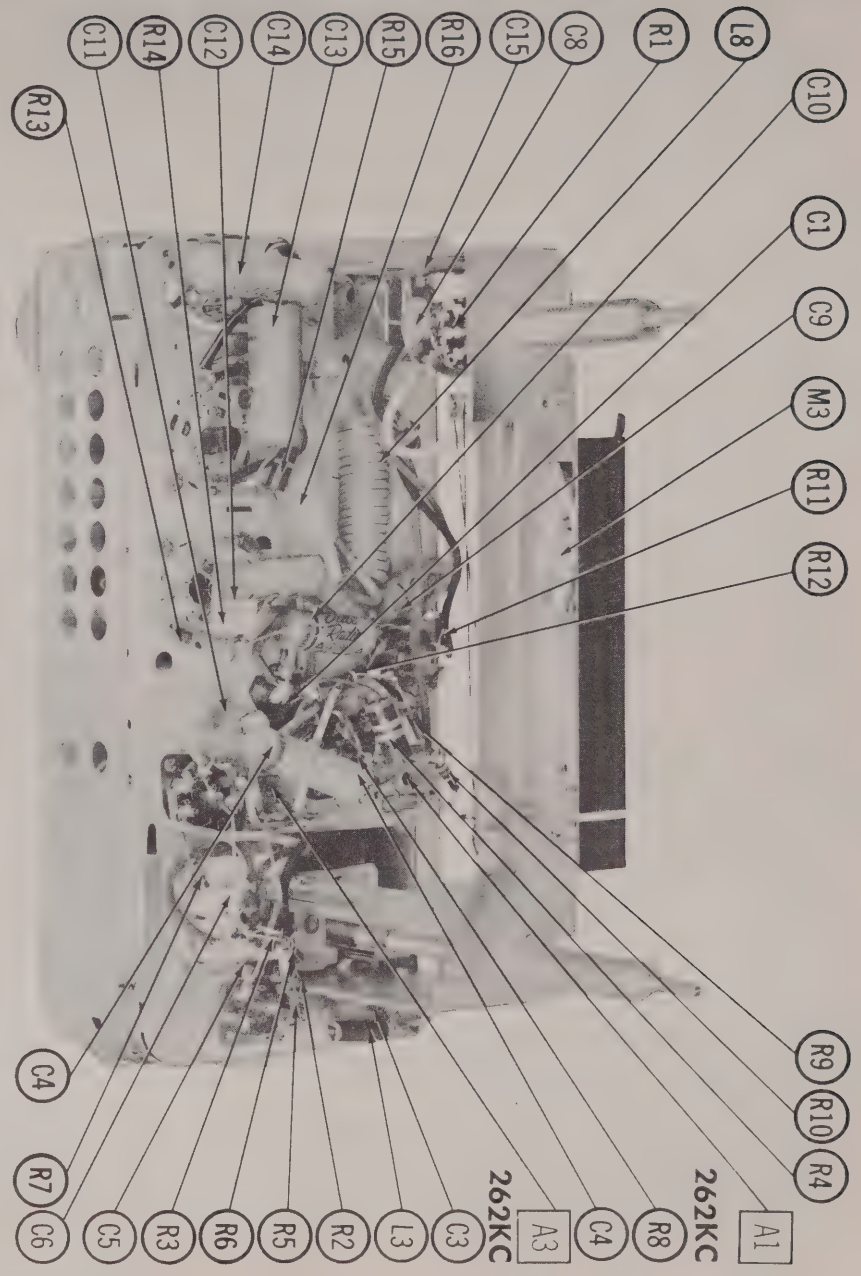
CABINETS & CABINET PARTS

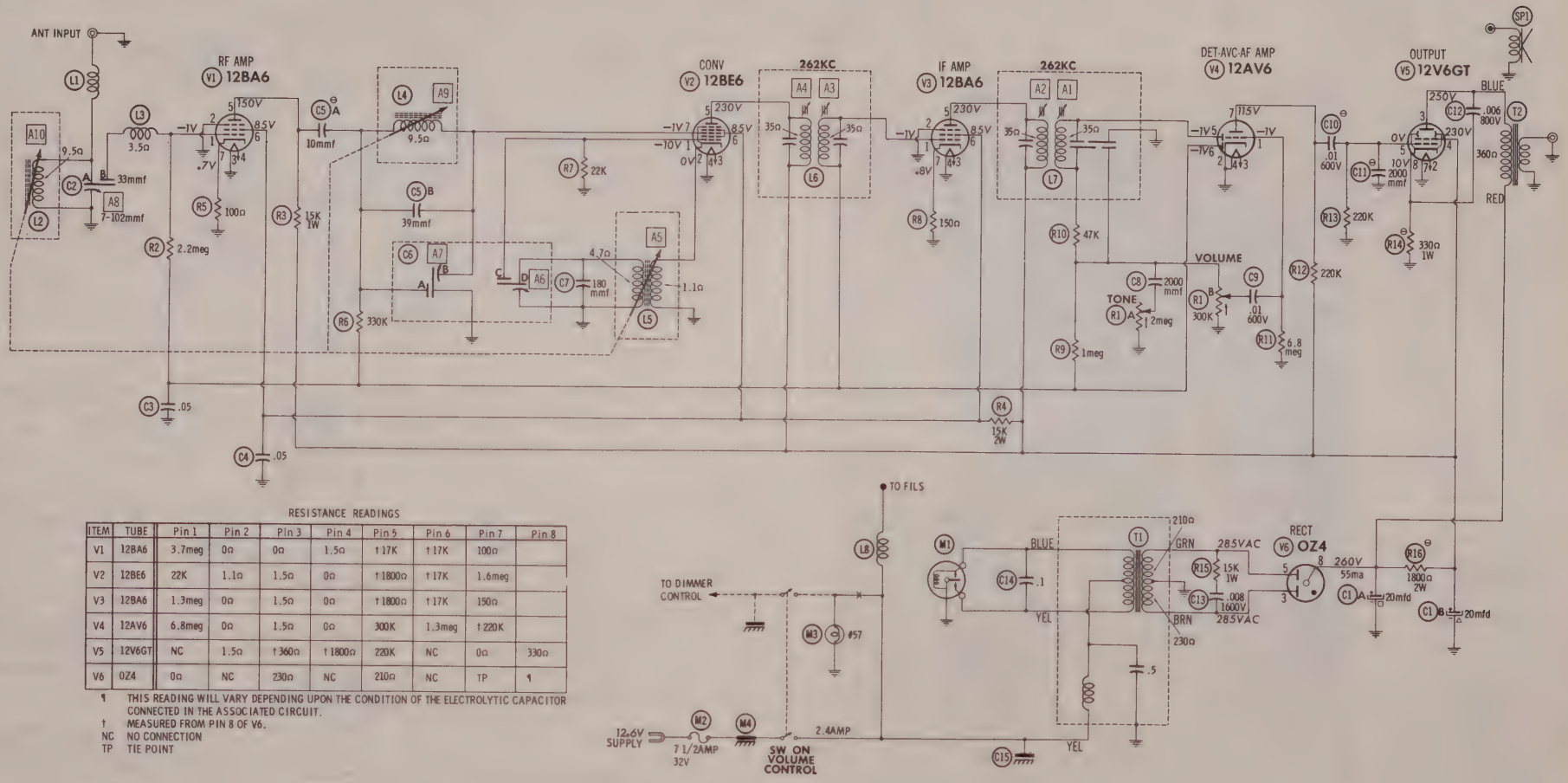
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors
Shielded Hook-up Wire ..... Use BELDEN No. 8885
Bonding Strap ..... Use BELDEN No. 8661

CHASSIS—BOTTOM VIEW





RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V1	12BA6	3.7meg	0Ω	0Ω	1.5Ω	†17K	†17K	100Ω	
V2	12BE6	22K	1.1Ω	1.5Ω	0Ω	†1800Ω	†17K	1.6meg	
V3	12BA6	1.3meg	0Ω	1.5Ω	0Ω	†1800Ω	†17K	150Ω	
V4	12AV6	6.8meg	0Ω	1.5Ω	0Ω	300K	1.3meg	†220K	
V5	12V6GT	NC	1.5Ω	†360Ω	†1800Ω	220K	NC	0Ω	330Ω
V6	0Z4	0Ω	NC	230Ω	NC	210Ω	NC	TP	¶

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC CAPACITOR CONNECTED IN THE ASSOCIATED CIRCUIT.
† MEASURED FROM PIN 8 OF V6.
NC NO CONNECTION
TP TIE POINT

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Battery voltage maintained at 12.6 volts for voltage readings.
5. Nominal tolerance on component values makes posssible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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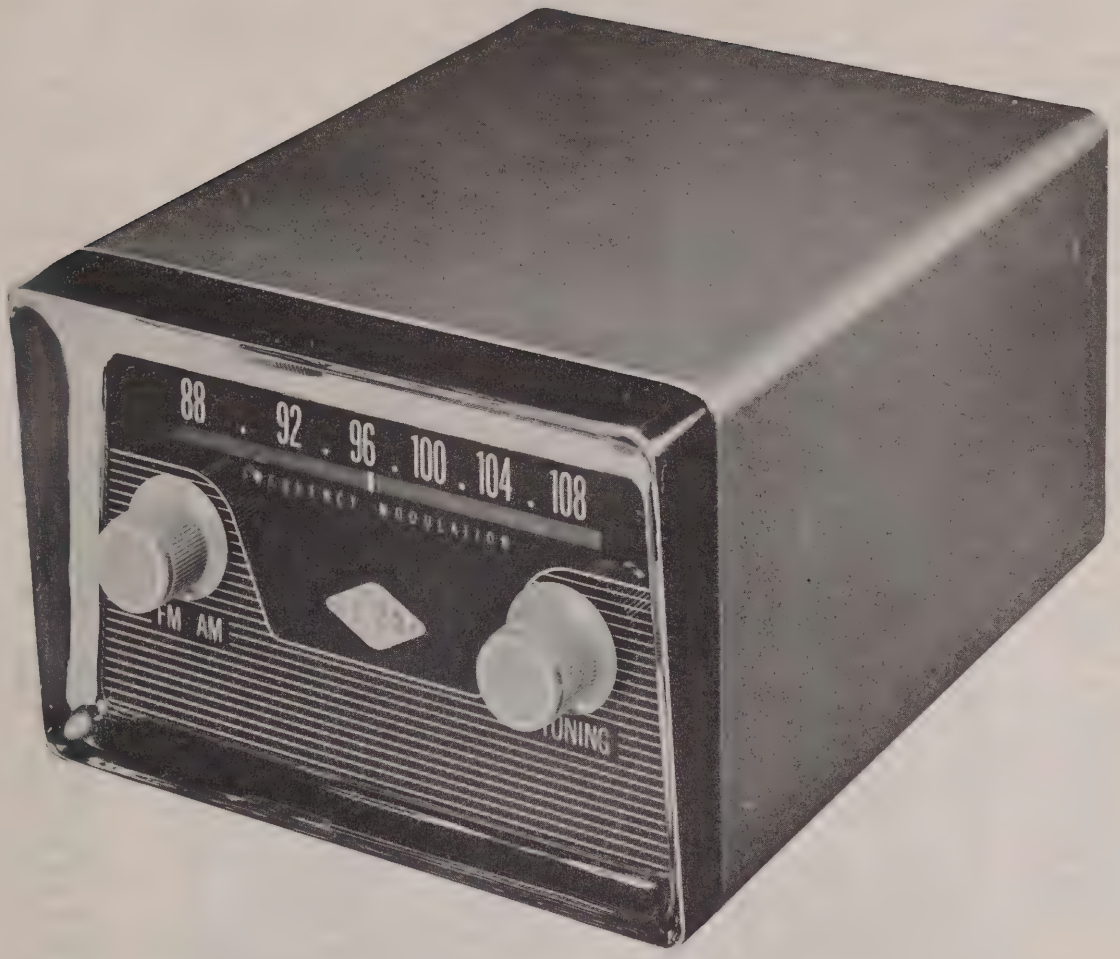
GMC MODEL 2233398

PHOTOFACT* Folder

GONSET
MODEL 3239

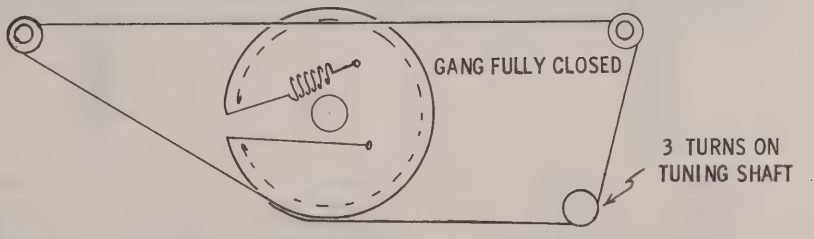
GONSET
MODEL 3239



GONSET
MODEL 3239

TRADE NAME	Gonset Model 3239
MANUFACTURER	Gonset Division of L. A. Young Spring & Wire Corp., 801 S. Main St., Burbank, California
TYPE SET	Battery Operated Universal Type Automobile FM Converter
TUBES	Seven
POWER SUPPLY	12 Volt Storage Battery RATING 1.4MA@12.6Volts DC
TUNING RANGE - FREQ. MOD.	88-108MC

DIAL CORD STRINGING



HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of H936

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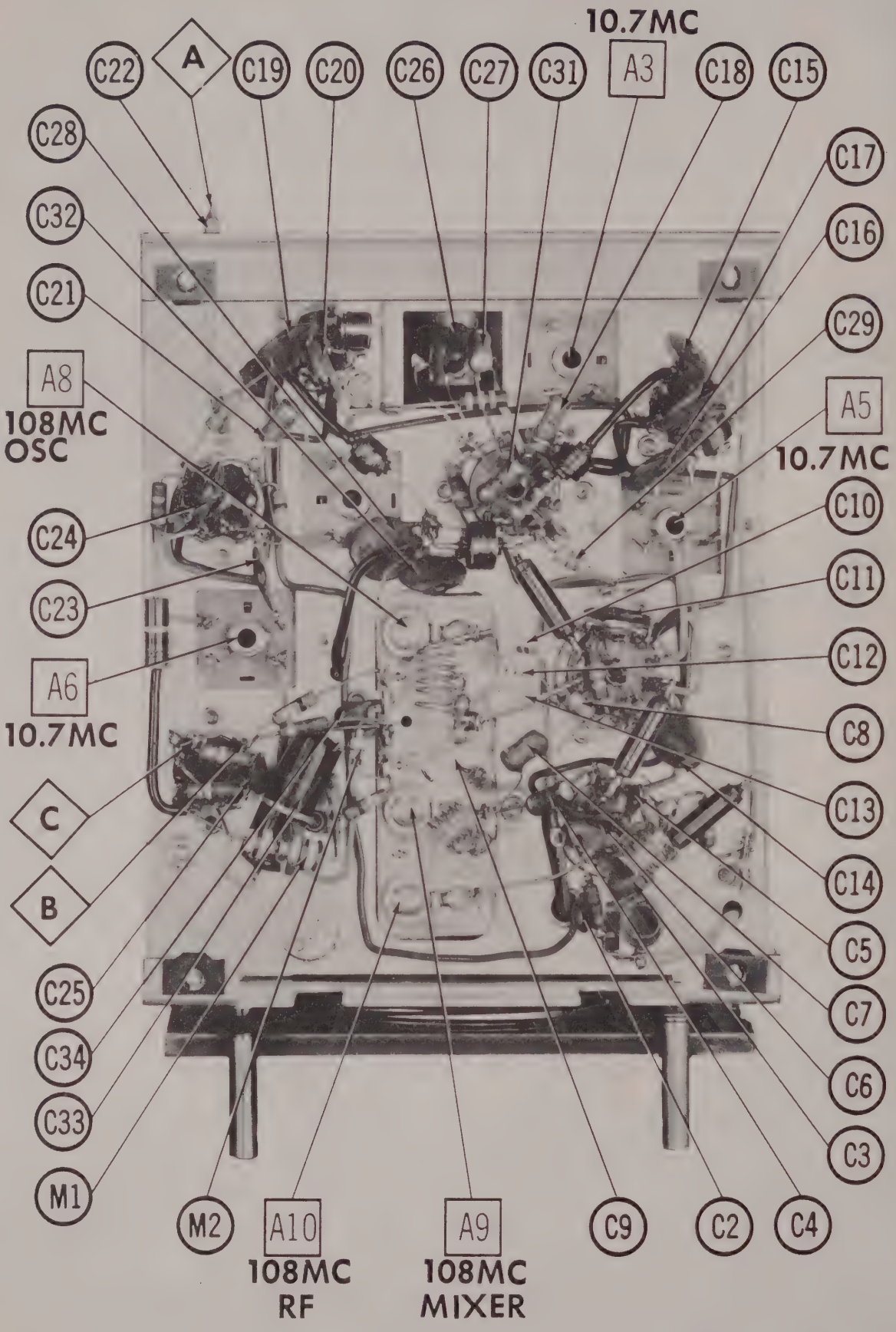
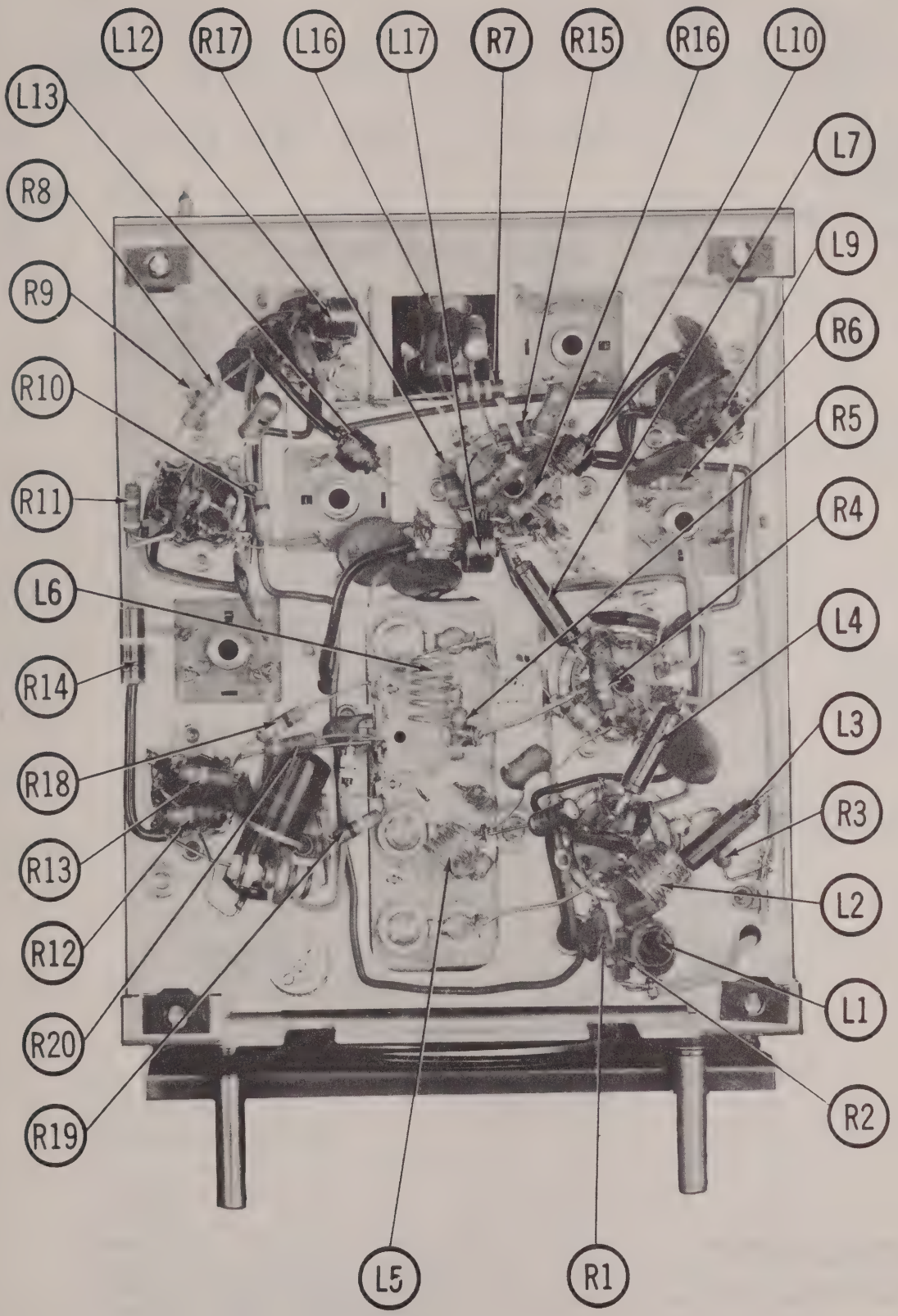
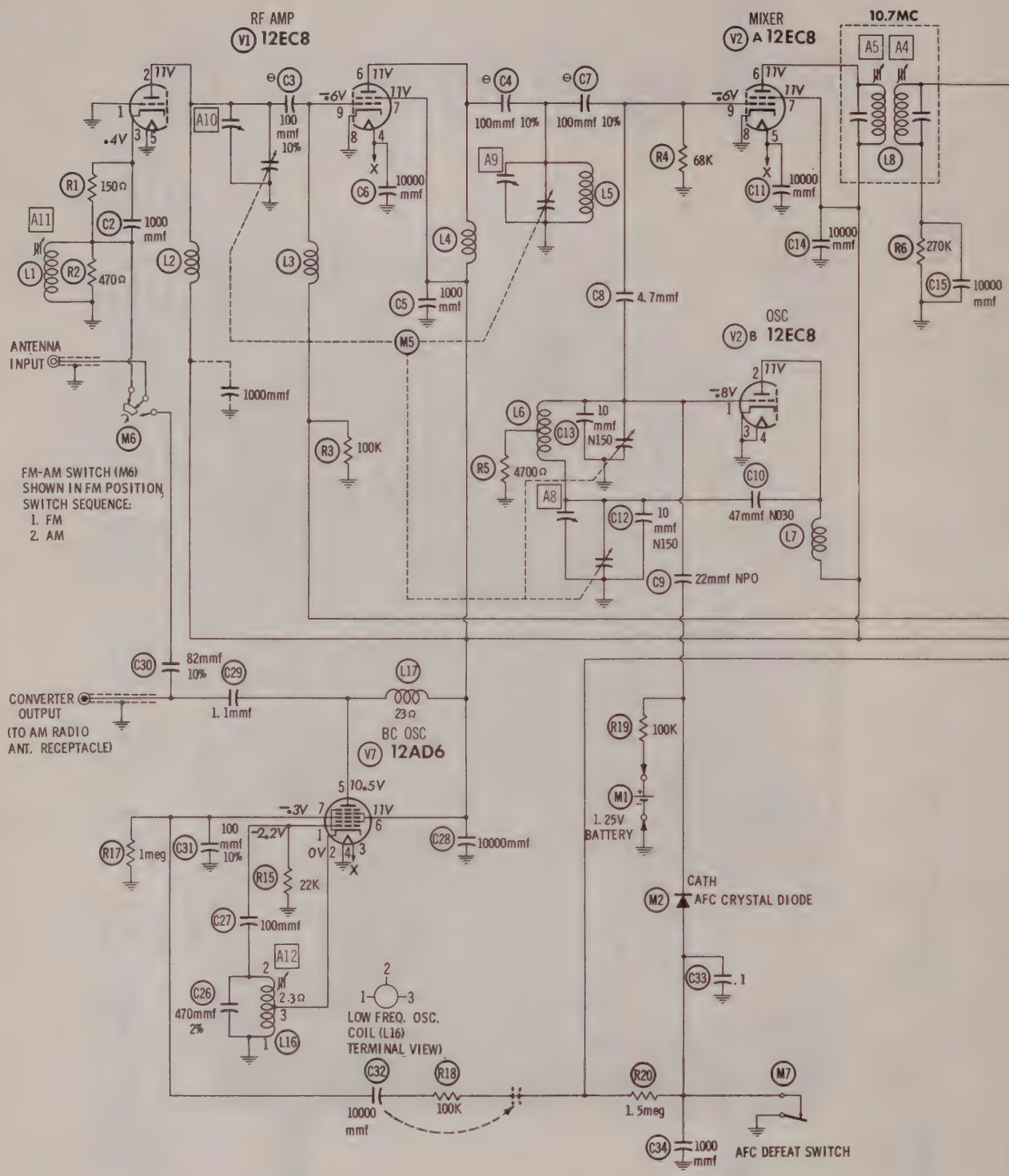
SET 438 FOLDER 8



CHASSIS BOTTOM VIEW - CAPACITOR, MISC. & ALIGN IDENTIFICATION



CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION



Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

1. DC voltage measurements taken with vacuum tube voltmeter.
2. Socket connections shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Battery voltage maintained at 12.6 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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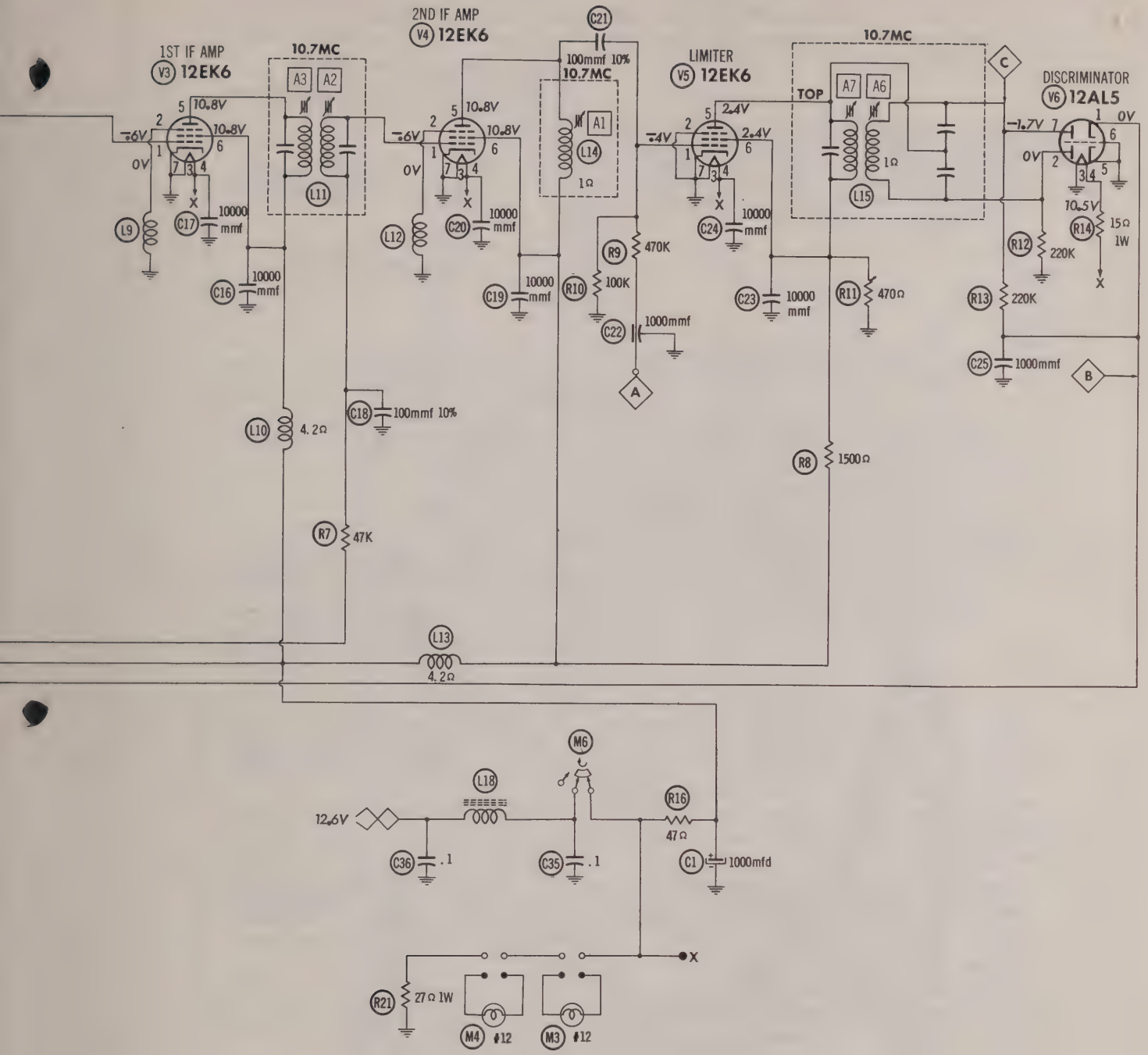


RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12EC8	0Ω	†47Ω	150Ω	1.1Ω	0Ω	†47Ω	†47Ω	0Ω	100K
V2	12EC8	4700Ω	†47Ω	0Ω	0Ω	1.1Ω	†47Ω	†47Ω	0Ω	68K
V3	12EK6	270K	.1Ω	0Ω	1.1Ω	†51Ω	†51Ω	0Ω		
V4	12EK6	147K	.1Ω	0Ω	1.1Ω	†51Ω	†51Ω	0Ω		
V5	12EK6	100K	0Ω	0Ω	1.1Ω	†350Ω	†350Ω	0Ω		
V6	12AL5	400K	220K	0Ω	7Ω	0Ω	0Ω	220K		
V7	12AD6	22K	.5Ω	1.1Ω	0Ω	†70Ω	†47Ω	1meg		

† MEASURED FROM JUNCTION OF R14 AND R16

GONSET
MODEL 3239

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Connect jumper across AFC Defeat switch (M7).

Suggested alignment tools:
A1 thru A7, A11, A12..... GENERAL CEMENT #8606, 8606L, 8282, 9295
WALSCO #2543, 2544, 2545
A8, A9, A10..... GENERAL CEMENT #5000, 5003, 5004, 5009, 8276, 8290
WALSCO #2515, 2520, 2523, 2525, 2537

FM IF ALIGNMENT USING AM SIGNAL GENERATOR & VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
1.	.001mfd	High side to pin 9 (grid) of 12EC8 (V2). Low side to chassis.	10.7MC (Unmod.)	Point of non-interference	DC probe to point (A). Common to chassis.	A1, A2, A3, A4, A5	Adjust for maximum deflection.
2.	"	"	"	"	DC probe thru 1meg resistor to point (C). Common to chassis.	A7	Adjust for maximum deflection.
3.	"	"	"	"	DC probe to point (B). Common to chassis.	A6	Adjust for zero reading. A positive & negative reading will be obtained on either side of the correct setting.

Disconnect signal generator and connect antenna. With VTVM connected to point (B), readjust A6 for zero reading when tuner is tuned to background noise.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR & OSCILLOSCOPE

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
1.	.001 mfd	High side to pin 9 (grid) of 12EC8 (V2). Low side to chassis.	10.7MC (450KC SWP)	Point of non-interference.	Vert. amp to point (A). Low side to chassis.	A1, A2, A3, A4, A5	Adjust for curve of maximum amplitude and symmetry similar to Fig. 1.
2.	"	"	"	"	Vert. amp thru 1meg resistor to point (C). Low side to chassis.	A7	Adjust A7 for maximum amplitude and straightness of crossover lines similar to Fig. 2.
3.	"	"	"	"	Vert. amp to point (B). Low side to chassis.	A6	Adjust so that 10.7MC occurs at center of crossover lines similar to Fig. 2.

Disconnect signal generator and connect antenna. With VTVM connected to point (B), readjust A6 for zero reading when tuner is tuned to background noise.

FM RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
4.	47Ω carbon resistor	High side thru 47Ω to antenna receptacle. Low side to chassis.	108MC (Unmod.)	108MC	DC probe to point (A). Common to chassis.	A8, A9, A10, A11	Adjust for maximum deflection.
5.	Adjust A12 to a quiet point near 800KC on AM radio dial.						

FIG. 1

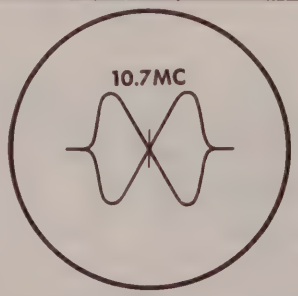
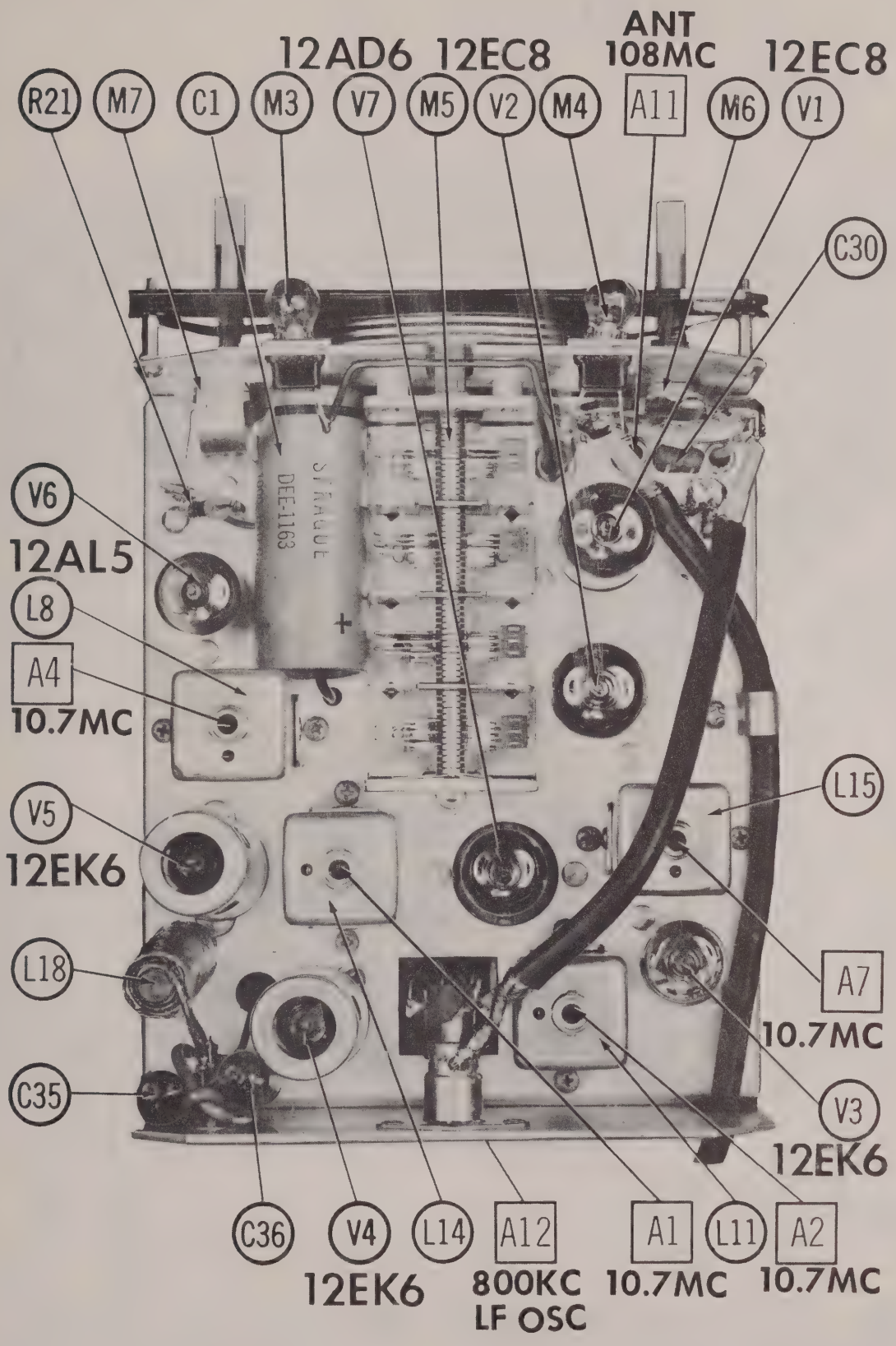


FIG. 2



CHASSIS TOP VIEW

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	RF Amplifier	12EC8	
V2	Mixer-Oscillator	12EC8	
V3	1st IF Amplifier	12EK6	
V4	2nd IF Amplifier	12EK6	

ITEM No.	USE	TYPE	NOTES
V5	Limiter	12EK6	
V6	Discriminator	12AL5	
V7	BC Oscillator	12AD6	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT.	GONSET PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	
C1	1000	15		PRS15V1000	BR10001	TC1501	TD-1000-15	TVA-1163	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING			REPLACEMENT DATA						NOTES
	CAP.	VOLT	TOL	GONSET PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	1000				BPD-001	DD-102	BYA10D1M	B-210	5HK-D1	
C3	100		10%		SI 100	D6-101	L10T1	CNO-310	5GA-T1	①
C4	100		10%		SI 100	D6-101	L10T1	CNO-310	5GA-T1	①
C5	1000				BPD-001	DD-102	BYA10D1	B-210	5HK-D1	
C6	10000				BPD-01	DD-103	BYA10S1	B-110	5GA-S1	
C7	100		10%		SI 100	D6-101	L10T1	CNO-310	5GA-T1	①
C8	4.7				NPO-SI 4.7	TCZ-4R7	C10V47C	CNO-547	5TCCB-V47	
C9	22		NPO		SI 22	D6-220	LT6Q22	UC-5422	5GA-Q22	
C10	47		N030		SI 47	D6-470	LT6Q47	UC-5447	5GA-Q47	
C11	10000				BPD-001	DD-103	BYA10S1	B-110	5GA-S1	
C12	10		N150		SI 10	D6-100	LT6Q1	UC-541	5GA-Q1	
C13	10		N150		SI 10	D6-100	LT6Q1	UC-541	5GA-Q1	
C14	10000				BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C15	10000				BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C16	10000				BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C17	10000				BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C18	100		10%		SI 100	D6-101	L10T1	CNO-310	5GA-T1	
C19	10000				BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C20	10000				BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C21	100		10%		SI 100	D6-101	L10T1	CNO-310	5GA-T1	
C22	1000				EF-001	MFT-1000			503C-D1	
C23	10000				BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C24	10000				BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C25	1000				BPD-001	DD-102	BYA10D1	B-210	5HK-D1	
C26	470		2%		SI 100	D6-101	L10T1	CNO-310	5GA-T1	
C27	100				BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C28	10000				NPO-SI 1.5	TCZ-1R5	C10V15C	CNO-510	5TCCB-V1	
C29	1.1				SI 82	D6-820	L10Q82	CNO-482	5GA-Q82	
C30	82		10%		SI 100	D6-101	L10T1	CNO-515	5GA-T1	
C31	100		10%		BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C32	10000				P288N- 1	DF-104	CUB2P1	GEM-201	2TM-P1	
C33	.1	200			BPD-001	DD-102	BYA10D1	B-210	5HK-D1	
C34	1000				P288N- 1	DF-104	CUB2P1	GEM-201	2TM-P1	
C35	.1	200			P288N- 1	DF-104	CUB2P1	GEM-201	2TM-P1	
C36	.1	200								

① Some versions may use 30mmf in this application.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		GONSET PART No.	NOTES
	OHMS	WATT		
R1	150Ω			
R2	470Ω			
R3	100K			
R4	68K			

ITEM No.	RATING		GONSET PART No.	NOTES
	OHMS	WATT		
R5	4700Ω			
R6	270K			
R7	47K			
R8	1500Ω			

RESISTORS (cont)

ITEM No.	RATING		GONSET PART No.	NOTES
	OHMS	WATT		
R9	470K			
R10	100K			
R11	470Ω			
R12	220K			
R13	220K			
R14	15Ω	1		
R15	22K			

ITEM No.	RATING		GONSET PART No.	NOTES
	OHMS	WATT		
R16	47Ω			
R17	1meg			
R18	100K			
R19	100K			
R20	1.5meg			
R21	27Ω	1		

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					NOTES
		GONSET PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	Ant. Coil						
L2	RF Coil						
L3	RF Choke		19-1004	BC-565	4609		5.6 Microhenries
L4	RF Choke		19-1004	BC-565	4609		5.6 Microhenries
L5	Mixer Coil						
L6	Osc. Coil						
L7	RF Choke		19-1004	BC-565	4609		5.6 Microhenries
L8	1st IF Trans.	014-022	16-3487*	FM-254*	1463*		*Use Adaptor Mount Plate
L9	RF Choke		19-1001	BC-562	4604		1.4 Microhenries
L10	RF Choke		19-3100	TV-194	4632		100 Microhenries
L11	2nd IF Trans.	014-022					
L12	RF Choke		19-1001	BC-562	4604		1.4 Microhenries
L13	RF Choke		19-3100	TV-194	4632		100 Microhenries
L14	3rd IF Trans.	014-023					
L15	Discriminator	014-024					
L16	Low Freq. Osc. Coil						
L17	RF Choke		19-4950	BC-513	4652		1 Millihenry
L18	Hash Choke						65 Microhenries

BATTERIES

ITEM No.	VOLTAGE	GONSET PART No.	REPLACEMENT DATA						NOTES
			BURGESS		EVEREADY		MALLORY		
			"A"	"B"	"A"	"B"	"A"	"C"	
M1	1.25V							BC-3 ①	① Bias Cell (Snap In)

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		GONSET PART No.	CBS PART No.	SYLVANIA PART No.	
M2	*				AFC Diode (Pigtail) (*Pacific, #V-20)

MISCELLANEOUS

ITEM No.	PART NAME	GONSET PART No.	NOTES
M3	Lamp		#12
M4	Lamp		#12
M5	Tuning Cap.		FM, 4 Section
M6	Switch		FM-AM (Rotary, Wafer Type)
M7	Switch		AFC Defeat (Push, Spring Return Type)

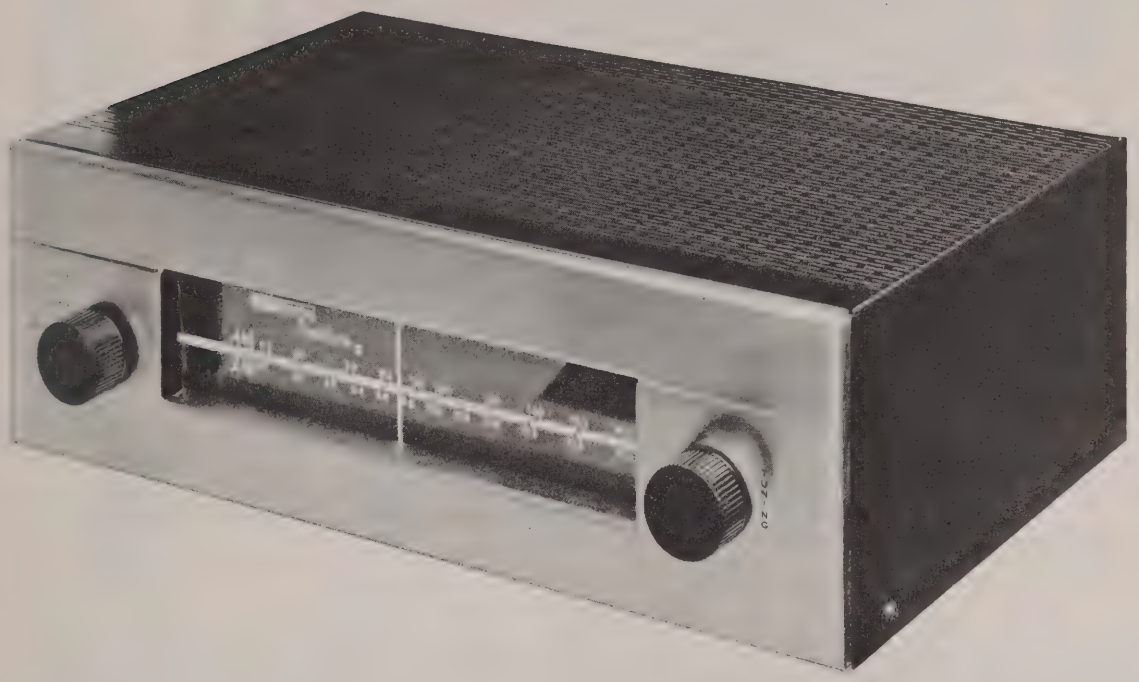
WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors
Shielded Hook-up Wire ..... Use BELDEN No. 8885
Bonding Strap ..... Use BELDEN No. 8881

PHOTOFACT* Folder

HARMAN-KARDON
MODEL T-12

HARMAN-KARDON
MODEL T-12



HARMAN-KARDON
MODEL T-12

TRADE NAME	Harman-Kardon Model T-12 (The Overture II)		
MANUFACTURER	Harman-Kardon, Inc., 520 Main Street, Westbury, Long Island, N. Y.		
TYPE SET	AC Operated FM-AM Tuner		
TUBES	Seven		
POWER SUPPLY	105 - 125 Volts AC, 60 Cycles	RATING	30 Watts, .26 Amp@117 Volts AC
TUNING RANGES	BROADCAST 530-1650KC	FREQ. MOD.	88-108MC

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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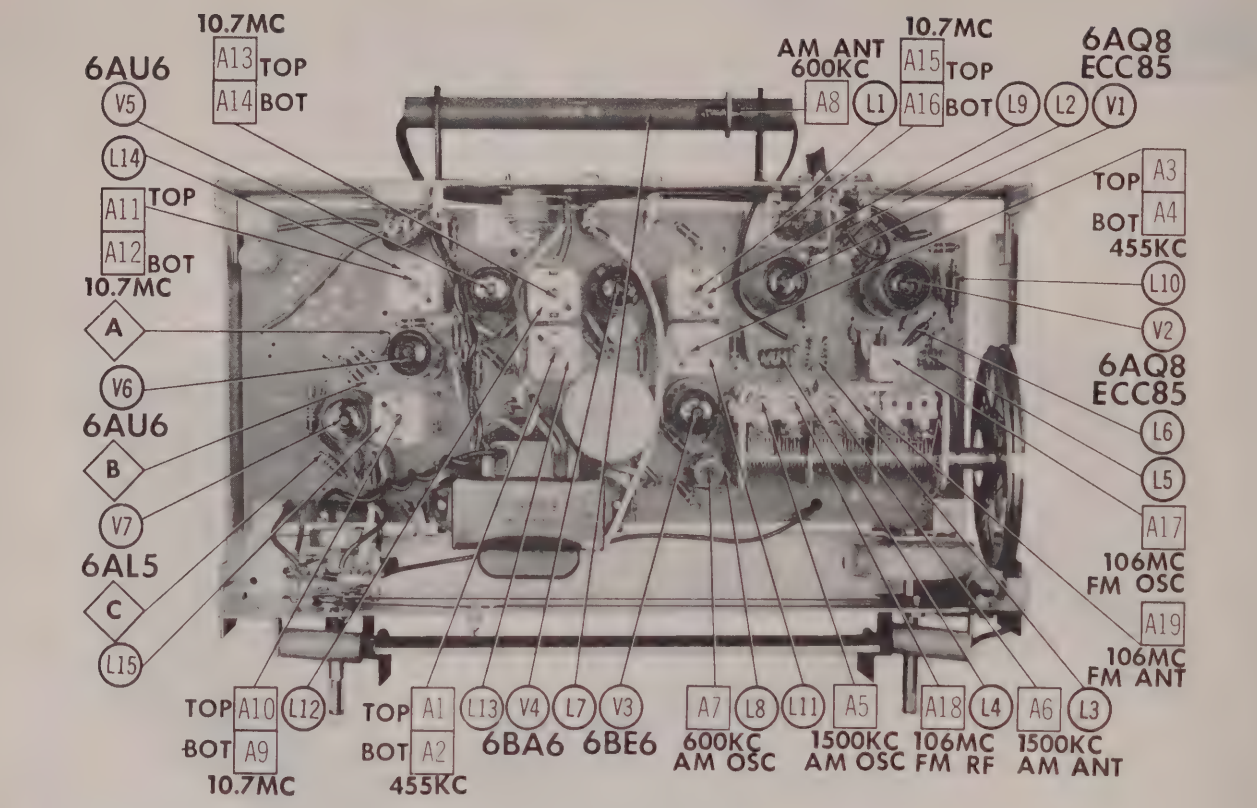
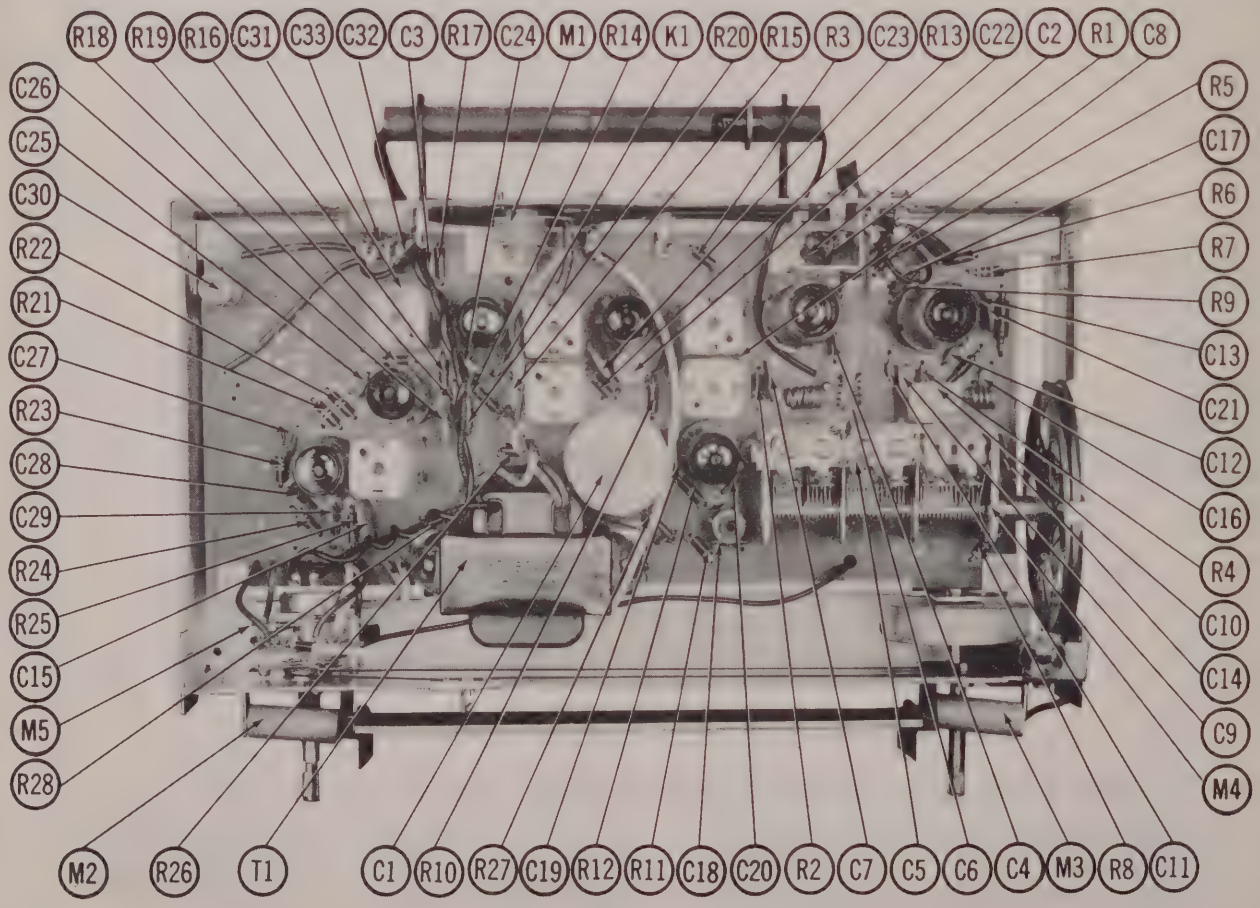
SET 438 FOLDER 9





CHASSIS TOP VIEW

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE
V1	FM RF Amp.-FM Mixer	6AQ8/ECC85
V2	FM Osc. - FM AFC	6AQ8/ECC85
V3	AM Converter	6BE6
V4	1st FM AM IF Amplifier	6BA6
V5	2nd FM IF Amp. AM Det. - AVC	6AU6
V6	FM Limiter	6AU6
V7	Discriminator	6AL5

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA Harman-Kardon PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	■40	150	JE781436		BBRQ55515C			FMT-1550	R24ll *
B	60	150							
C	▲60	150							

* Non-Catalog Item

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA Harman-Kardon PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C2	470			SI 470	D6-471	LT6T47	UC-5347	5GA-T47	
C3	10000			BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C4	47			N750-DI 47	DTN-47	C10Q47U	NT-5447	5TCU-Q47	N750
C5	.68			NPO-SI .68	TCZ-R68				
C6	2.2			NPO-SI 2.2	TCZ-2R2	CTA6V22C		5TCCB-V22	
C7	10000			BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C8	10000			BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C9	100			N750-DI 100	DTN-100	C10T1U	NT-531	5TCU-T1	N750
C10	1-10		JV20688						
C11	470			BPD-00047	DD-471	BYA10T47	UC-5347	5GA-T47	
C12	10								N2200
C13	470			BPD-00047	DD-471	BYA10T47	UC-5347	5GA-T47	
C14	470			BPD-00047	DD-471	BYA10T47	UC-5347	5GA-T47	
C15	10000			BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C16	47								N5600
C17	470			BPD-00047	DD-471	BYA10T47	UC-5347	5GA-T47	
C18	100			N750-DI 100	DTN-100	C10T1U	NT-531	5TCU-T1	N750
C19	10000			BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C20	47			N750-DI 47	DTN-47	C10Q47U	NT-5447	5TCU-Q47	N750
C21	10000			BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C22	.05	200		P288N-05	DF-503	CUB2S5	ACE615	2TM-S5	
C23	10000			BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C24	10000			BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C25	47			N750-DI 47	DTN-47	C10Q47U	NT-5447	5TCU-Q47	N750
C26	10000			BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C27	100			N750-DI 100	DTN-100	C10T1U	NT-531	5TCU-T1	N750
C28	470				MD-471				10%
C29	470				MD-471				10%
C30	.05	200		P288N-05	DF-503	CUB2S5	ACE615	2TM-S5	
C31	10000			BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C32	10000	1400		DAC-27		HVE16S1		20HKB-S1	
C33	10000	1400		DAC-27		HVE16S1		20HKB-S1	

RESISTORS

All wattages 1/2 watt, or less. unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	Harman-Kardon PART No.	NOTES
R1	68Ω			
R2	3.3meg			
R3	15K			
R4	22K			
R5	6800Ω			
R6	100Ω			
R7	470K			
R8	47K			
R9	1000Ω			
R10	1meg			
R11	3300Ω			
R12	22K			
R13	1000Ω			
R14	220K			

ITEM No.	RATING OHMS	RATING WATT	Harman-Kardons PART No.	NOTES
R15	2.2meg			
R16	1000Ω			
R17	1000Ω			
R18	100K			
R19	10K			
R20	15K			
R21	100K			
R22	100K			
R23	33K			
R24	33K			
R25	1meg			
R26	33Ω			
R27	330Ω			
R28	330Ω			

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA Harman-Kardon PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	NOTES
L1	FM Antenna Coil				4584		.24 Microhenry
L2	RF Choke						3.3 Microhenries
L3	FM RF Coil	GL781543					
L4	FM Mixer Coil	GL781543					
L5	FM Osc. Coil	GL781544					
L6	Cathode Choke		19-1000	BC-561	4602		1 Microhenry
L7	Loop Stick	GL781479					
L8	AM Osc. Coil	GL1121988					
L9	1st FM IF	GT781993			1463-PC		
L10	RF Choke						3.3 Microhenries
L11	1st AM IF	GT782122	16-6780	BC-356	13-PC1	RF-4	
L12	2nd FM IF	GT781994			1463-PC		
L13	2nd AM IF	GT782123	16-6780	BC-357	13-PC2	RF-4	
L14	3rd FM IF	GT781995			1463-PC		
L15	Discriminator	GT782124					

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	REPLACEMENT DATA Harman-Kardon PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V @ .33A	120V @ .050A Tap @ 6.3V @ 2.6A		FT781419				PA8421 ①		

① Drill new mounting holes

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	Harman-Kardon PART No.	REPLACEMENT DATA
K1	Detector RF Filter	150mmf, 150mmf, 47K	PC781599	Aerovox PA-98 Centralab PC-57 Cornell-Dubilier 111TM2 Sprague D-2

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS--READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT
Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

AM ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
1.	.1mfd	High side to AM antenna stator lug of tuning gang. Low side to chassis.	455KC (400~ Mod)	AM	Tuning gang fully open	AC probe to Output Jack. Common to chassis.	A1, A2, A3, A4	Adjust for maximum output.
2.		Loop	1500KC	"	1500KC	"	A5, A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		"	600KC	"	600KC	"	A7, A8	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output. Repeat steps 2 and 3.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
4.	.01mfd	High side to pin 1 (grid) of 6AU6 (V6). Low side to chassis.	10.7MC (Unmod.)	FM	Point of non-interference	DC probe to point (B). Common to chassis.	A9	Adjust for maximum deflection.
5.	"	"	"	"	"	DC probe to point (C). Common to chassis.	A10	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.
6.	"	High side to FM RF stator lug of tuning gang. Low side to chassis.	"	"	"	DC probe to point (A). Common to chassis.	A11, A12, A13, A14, A15, A16	Adjust for maximum deflection.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60~ modulation and 450KC sweep. Use 120~ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
4.	.01mfd	High side to pin 1 (grid) of 6AU6 (V6). Low side to chassis.	10.7MC (450KC Swp)	FM	Point of non-interference	Vert. Amp. to point (B). Low side to chassis.	A9	Adjust for curve of maximum amplitude and symmetry similar to Fig. 1.
5.	"	"	"	"	"	Vert. Amp. to point (C). Low side to chassis.	A10	Adjust so that 10.7MC occurs at center of crossover lines similar to Fig. 2. SLIGHTLY retouch A9 for maximum amplitude and straightness of crossover lines.
6.	"	High side to FM RF stator lug of tuning gang. Low side to chassis.	"	"	"	Vert. Amp. to point (A). Low side to chassis.	A11, A12, A13, A14, A15, A16	Adjust for curve of maximum amplitude and symmetry similar to Fig. 1.

FM RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
8.	270Ω Carbon Resistor	High side thru 270Ω to FM antenna terminal. Low side to chassis.	106MC	FM	106MC	DC probe to point (A). Common to chassis.	A17, A18, A19	Adjust for maximum deflection.
9.	"	"	90MC	"	90MC	"	L5, L4, L3	Adjust for maximum deflection by compressing or expanding coil turns while rocking gang thru 90MC signal.

FIG. 1

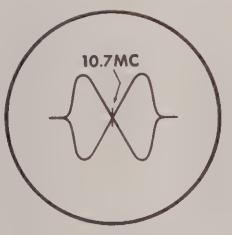


FIG. 2

PARTS LIST AND DESCRIPTIONS (Continued)

SELENIUM RECTIFIER

ITEM No.	RATING CURRENT (Measured)	REPLACEMENT DATA Harman-Kardon PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	SARKES TARZIAN PART No.	NOTES
M1	.040A	Z1362133 ①	1002A ①	RS065 ①	65 ① M150 ②	① Selenium Type ② Silicon Type

MISCELLANEOUS

ITEM No.	PART NAME	Harman-Kardon PART No.	NOTES
M2	Lamp		#51 (Not used in some versions)
M3	Lamp		#51 (Not used in some versions)
M4	Tuning Cap.	JVC0M2183	5 Gang, AM-FM
M5	Switch	ER167220	Function & Power On-Off, Rotary Wafer Type
	Printed Board	PCOM2264A	

CABINETS & CABINET PARTS

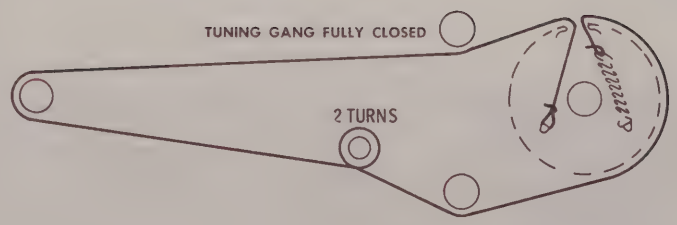
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Dial Glass Ass'y.	P1672184	
Dial Pointer	PC0M2334	
Knob	P20778	Tuning
Eacutcheon	P1672225	
Cage	P1672214	

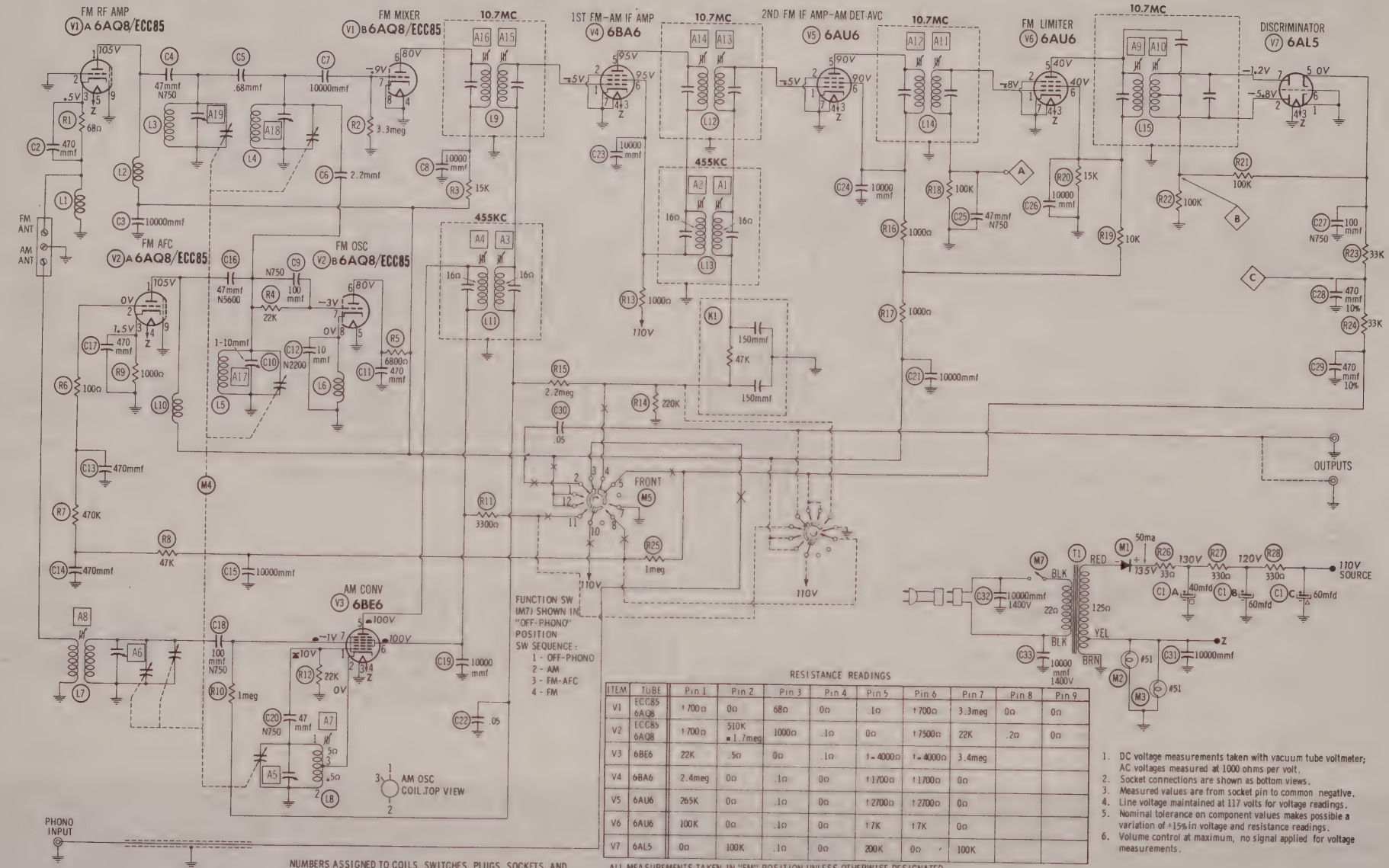
WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord	Use BELDEN No. 1765-B (6 Ft. Length) 1725-K (7½ Ft. Length)
Low-Loss Shielded Lead (Interconnecting)	Use BELDEN No. 8401
Phono Pick-up Arm Cable	Use BELDEN No. 8430 (Two Conductor - Twisted)

DIAL CORD STRINGING



PULLEY
SIDE VIEW



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	ECC85	†700Ω	0Ω	68Ω	0Ω	.1Ω	†700Ω	3.3meg	0Ω	0Ω
	6AQ8									
V2	ECC85	†700Ω	510K ▪1.7meg	1000Ω	.1Ω	0Ω	†7500Ω	22K	.2Ω	0Ω
	6AQ8									
V3	6BE6	22K	.5Ω	0Ω	.1Ω	†-4000Ω	†-4000Ω	3.4meg		
V4	6BA6	2.4meg	0Ω	.1Ω	0Ω	†1700Ω	†1700Ω	0Ω		
V5	6AU6	265K	0Ω	.1Ω	0Ω	†2700Ω	†2700Ω	0Ω		
V6	6AU6	100K	0Ω	.1Ω	0Ω	†7K	†7K	0Ω		
V7	6AL5	0Ω	100K	.1Ω	0Ω	200K	0Ω	100K		

ALL MEASUREMENTS TAKEN IN "FM" POSITION UNLESS OTHERWISE DESIGNATED
† MEASURED FROM OUTPUT OF M1
- MEASURED IN "AM" POSITION
▪ MEASURED IN "FM-AFC" POSITION

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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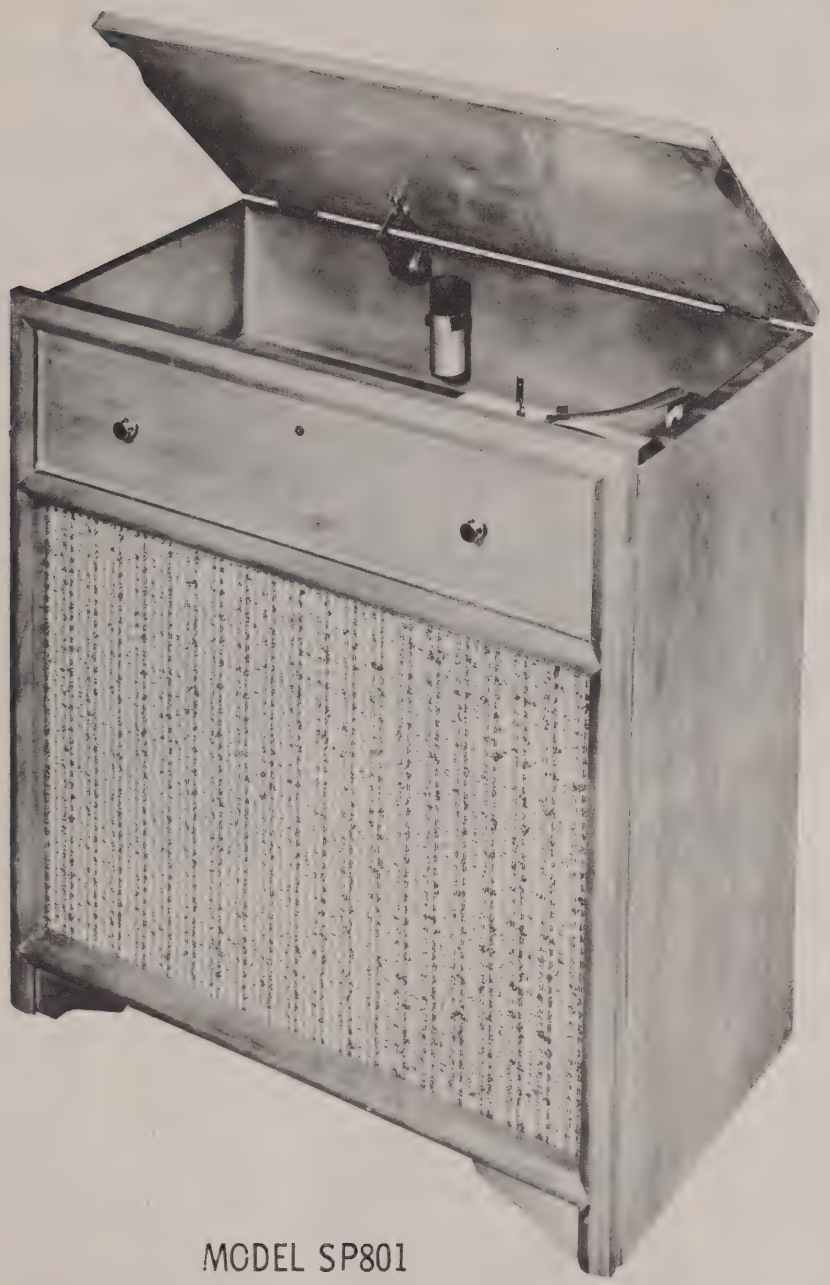
HARMAN-KARDON
MODEL T-12

PHOTOFACT* Folder

HOFFMAN MODELS B801, M801, SP801, W801 (Ch. 1112)

HOFFMAN MODELS B801, M801, SP801, W801 (Ch. 1112)



MODEL SP801

HOFFMAN MODELS B801, M801, SP801, W801 (Ch. 1112)

TRADE NAME	Hoffman Models B801, M801, SP801, W801 (Ch. 1112)
MANUFACTURER	Hoffman Radio Corp., 6200 S. Avalon Blvd., Los Angeles 3, California
TYPE SET	AC Operated Phono Amplifier With 4 Speed Automatic Record Changer
TUBES	Five
POWER SUPPLY	110 - 120 Volts AC, 60 Cycles RATING 53 Watts, .55 Amp@117 Volts AC (Less Motor)

FOR SERVICE INFORMATION ON RECORD CHANGER - SEE SIMILAR V-M 1200A - PHOTOFACT SET 353 FOLDER 16 OR RECORD CHANGER MANUAL RC-10.

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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H945

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE
V1	AF Amplifier	6AV6
V2	AF Amp. -Phase Inv.	ECC83/12AX7
V3	Output	EL84/6BQ5
V4	Output	EL84/6BQ5
V5	Rectifier	EZ81/6CA4

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	HOFFMAN PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	▲80	400	857105	AFH4-93-50	C0370	FP378	TMT-34	TVLS-4657.8*	
B	■40	350			BR2035	TC65	TD-20-350		
C	▲20	300							
D	20	300							

* Not normally in distributors stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	RATING TOL	HOFFMAN PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C2	82		10%		DI 82	DD-820	L10Q82	CNO-482	5GA-Q82	
C3	330				DI 330	DD-331	L10T33	B-333	5GA-T33	
C4	470		10%		DI 470	MD-471	BYA10T47	JL-347	5GA-T47	
C5	100				DI 100	MD-101	L10T1	CNO-310	5GA-T1	
C6	.047	200			P288N-047	DF-503	CUB2S47	GEM-4147	2TM-S47	
C7	47		10%		DI 47	MD-470	L10Q47	CNO-447	5GA-Q47	
C8	680		10%		DI 680	MD-681	BYA10T68	JL-368	5GA-T68	
C9	120				DI 120	MD-121	L10T12	CNO-312	5GA-T12	
C10	3300				DI 3300	MD-332	L10D33	B-233	5HK-D33	
C11	.1	600			P688N-1	DF-104	CUB6P1	GEM-601	6TM-P1	
C12	.1	400			P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C13	.1	600			P688N-1	DF-104	CUB6P1	GEM-601	6TM-P1	
C14	1500	1500		851115	HVD-15-1500	DD30-152	HVC16D15	2HV-215		
C15	1500	1500		851115	HVD-15-1500	DD30-152	HVC16D15	2HV-215		
C16	1.0	100			P288N-1.0		CUB2W1	GEM-21	2TM-M1	
C17	.1	600			P688N-1	DF-104	CUB6P1	GEM-601	6TM-P1	

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	HOFFMAN PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1meg	½	800005	BT-74	A47F5-1meg	Q19-137X	UT-443	Loudness, Tap @ 500K
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
C	Switch			KB-1 or KR-1*	SWE-12	76-1	US-26	On-Off
R2A	2meg	½	800004	B-75	A47-2meg-Z	Q13-139	U55	Bass
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
R3A	2meg	½	800033					Treble
B	Switch							Phono-Auxiliary
R4A	250Ω	½	800014	AB-2	A43-200	B11-201	R250L	Hum Adjust
B	Shaft			AK-1	FKS-1/4	SK2	Not Req.	

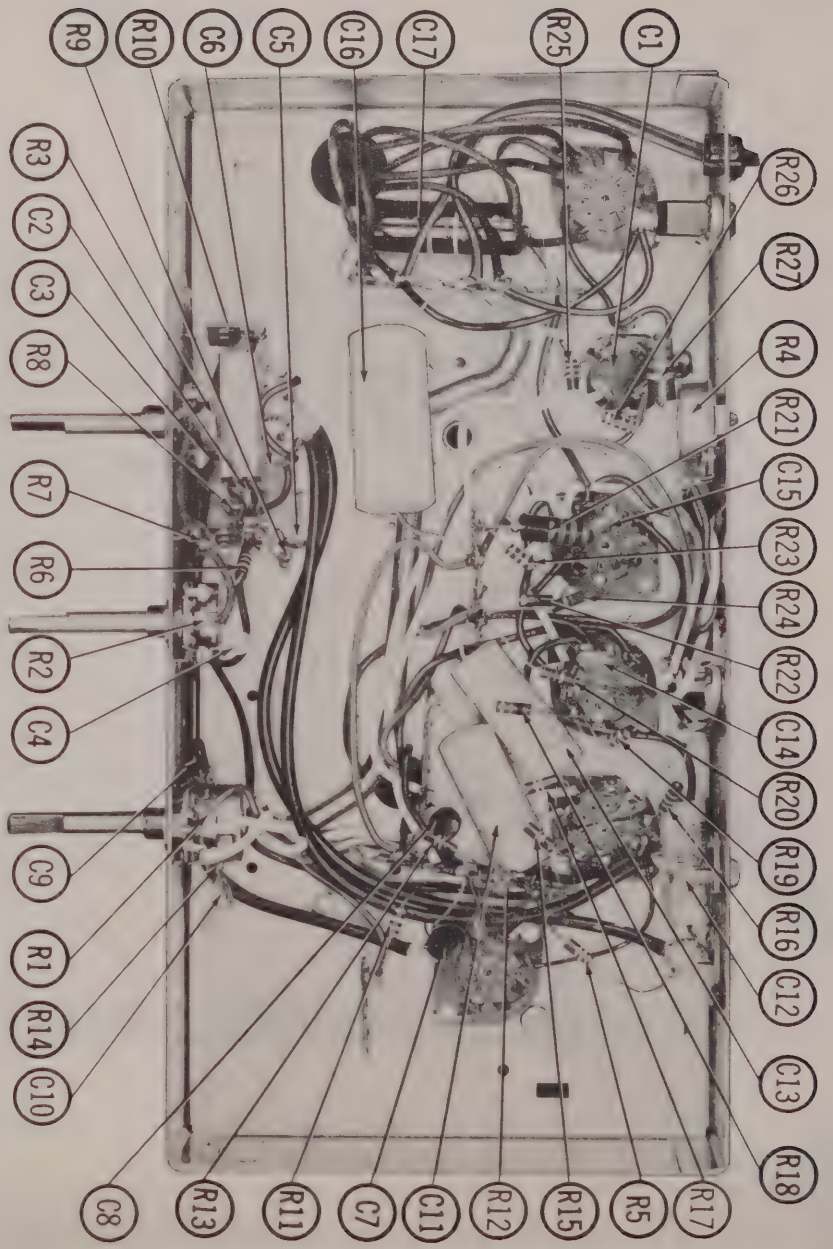
* Use KR with CRL "Red Label" controls and KB with "Blue Label" controls.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	HOFFMAN PART No.	NOTES
R5	470K			
R6	330K			
R7	1.2meg			
R8	1meg			
R9	270K			
R10	3.3meg			
R11	330K			
R12	22Ω			

CHASSIS-BOTTOM VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS (cont)

ITEM No.	RATING OHMS	RATING WATT	HOFFMAN PART No.	NOTES
R13	22K			
R14	33K			
R15	100K			
R16	68K			
R17	100K			
R18	1000Ω			
R19	330K			
R20	220Ω			
R21	160Ω	2		
R22	1000Ω			
R23	330K			
R24	220Ω			
R25	47K			
R26	33K			
R27	120Ω	2		

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	REPLACEMENT DATA HOFFMAN PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V ⓐ .55A	550 VCT ⓐ.072A	6.3V ⓐ 3.1A	716007	P9304	P-3052①		PC8404	22R04 ①	R-9B ①

① Use original shields.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA HOFFMAN PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T2	5200Ω CT	6-8Ω	724009-2 ①	Z1011	A-2905 ②	AU-609	A-3870	24S55	S-55X	① Alternate Part #706009 ② Drill new mounting hole

SPEAKER

ITEM No.	TYPE SIZE	TYPE FIELD	TYPE V. C. IMP.	REPLACEMENT DATA HOFFMAN PART No.	QUAM PART No.	NOTES
SP1	12"	PM	6-8Ω	708806	12A6PA	
SP2	5 1/4"	PM	6-8Ω	708202	52A1Z8.5	
SP3	3 1/2"	PM	6-8Ω	708001	3A07Z8	

PHONO CARTRIDGE

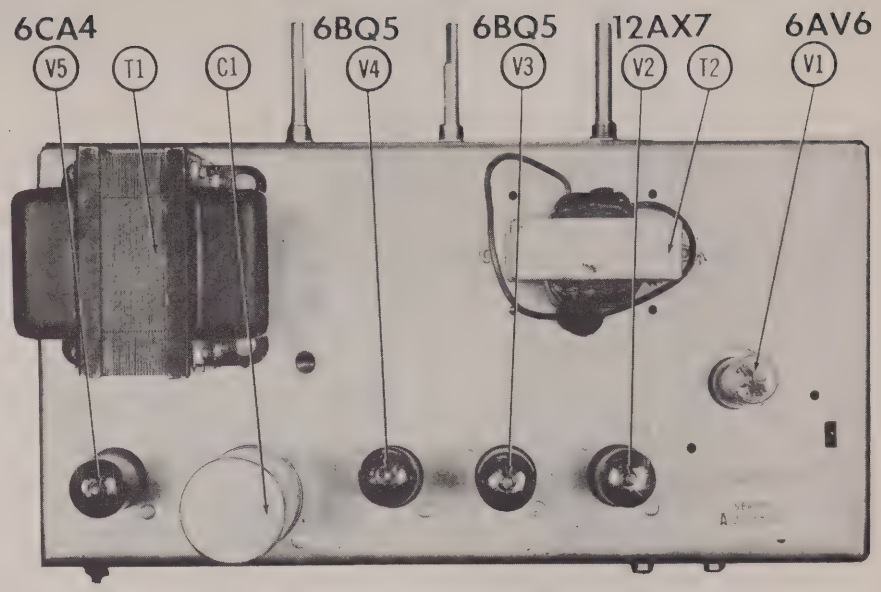
ITEM No.	REPLACEMENT DATA HOFFMAN PART No.	ASTATIC PART No. CARTRIDGE	ASTATIC PART No. NEEDLE	JENSEN PART No. CARTRIDGE	JENSEN PART No. NEEDLE	REMARKS
M1	981003	89-TB				

PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA HOFFMAN PART No.	JENSEN PART No.	WALCO PART No.	REMARKS
M2	990507 ① 990506 ②	† JPS-39 or †♦ JPS-39SD or ♦ JPS-39D	† W-41TPS or †♦ W-41DS or ♦ W-41TPD	† Jewel ♦ Diamond ① Dual Sapphire ② Diamond Sapphire

CHASSIS-TOP VIEW



MISCELLANEOUS

ITEM No.	PART NAME	HOFFMAN PART No.	NOTES
M3	Lamp	940044	#44

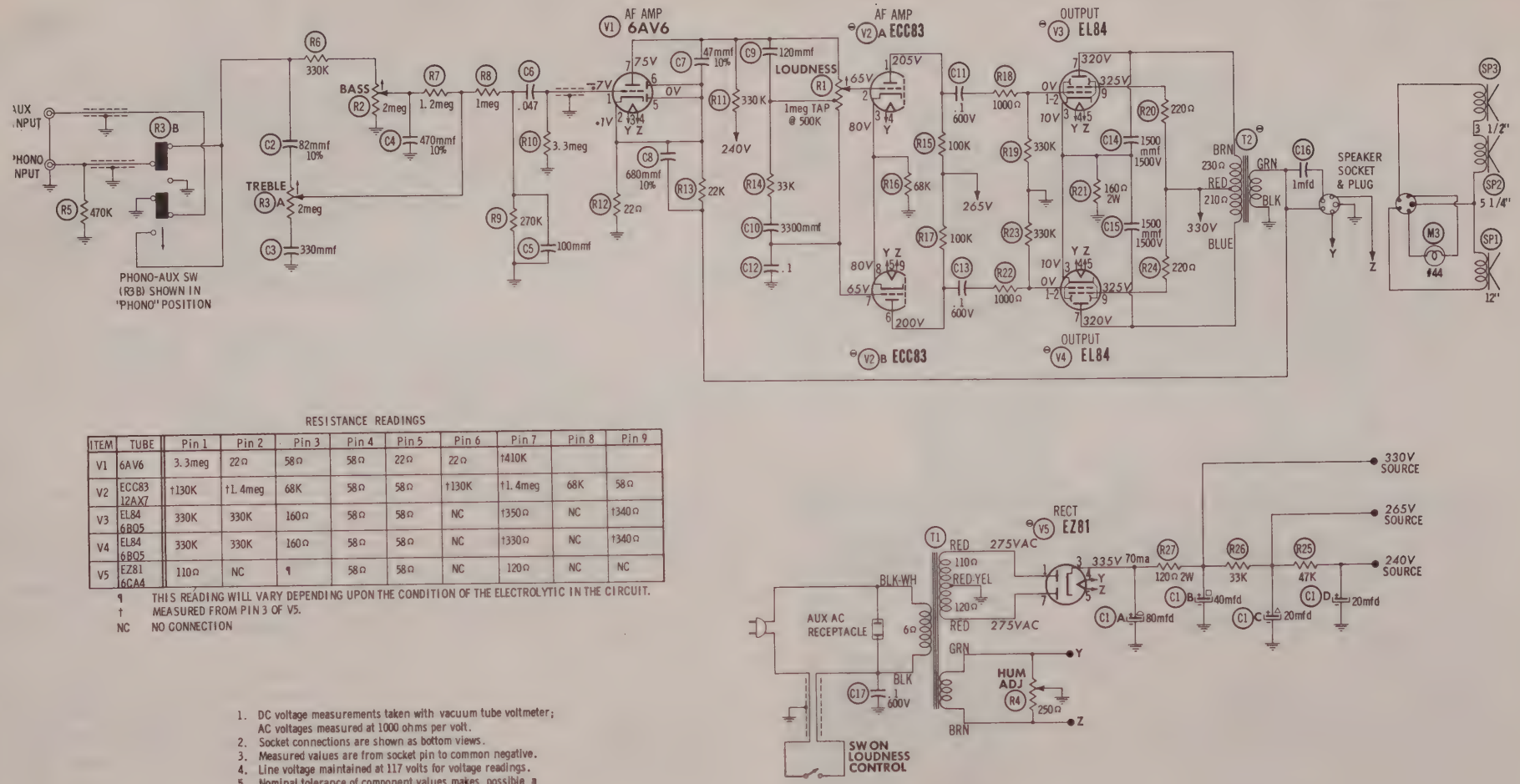
CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	500027	With Pointer, 3 Used
Cabinet	385008	Salem Maple, Model SP801
Cabinet	385006	Mahogany, Model W801
Cabinet	385007	Oak, Model M801
Cabinet	385005	Walnut, Model B801

WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord	Use BELDEN No. 1765-B (6 Ft. Length) 1725-K (7½ Ft. Length)
Low-Loss Shielded Lead (Interconnecting)	Use BELDEN No. 8401
Phono Pick-up Arm Cable	Use BELDEN No. 8430 (Two Conductor - Twisted)



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6AV6	3.3meg	22Ω	58Ω	58Ω	22Ω	22Ω	†410K		
V2	ECC83 12AX7	†130K	†1.4meg	68K	58Ω	58Ω	†130K	†1.4meg	68K	58Ω
V3	EL84 6BQ5	330K	330K	160Ω	58Ω	58Ω	NC	†350Ω	NC	†340Ω
V4	EL84 6BQ5	330K	330K	160Ω	58Ω	58Ω	NC	†330Ω	NC	†340Ω
V5	EZ81 6CA4	110Ω	NC	¶	58Ω	58Ω	NC	120Ω	NC	NC

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
† MEASURED FROM PIN 3 OF V5.
NC NO CONNECTION

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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HOFFMAN MODELS B801, M801, SP801, W801 (Ch. 1112)

PHOTOFACT* Folder

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

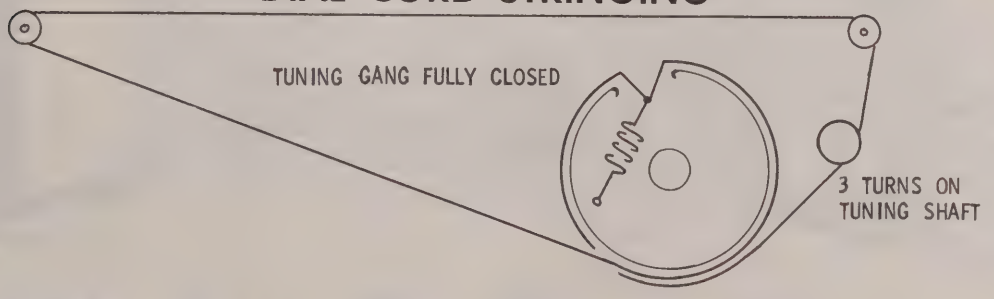
LAFAYETTE
MODEL LT-25

LAFAYETTE
MODEL LT-25

LAFAYETTE
MODEL LT-25

TRADE NAME	Lafayette Model LT-25		
SUPPLIER	Lafayette Radio, 165-08 Liberty Ave., Jamaica 33, N. Y.		
TYPE SET	AC Operated FM-AM Tuner		
TUBES (Seven)	Types 6U8A FM RF Amp.-FM Mixer, 12AT7 FM Osc.-FM AFC, 6BE6 AM Converter, 6BA6 1st FM AM IF Amp., 6AU6 2nd FM IF Amp.-AM Det.-AVC, 6AU6 FM Limiter, 6AL5 Discriminator		
POWER SUPPLY	105-125 Volts AC-60 Cycles	RATING	.28 Amp. @ 117 Volts AC (26 Watts) FM
TUNING RANGE - BROADCAST	535 - 1650KC	FREQ. MOD.	88 - 108MC

DIAL CORD STRINGING



HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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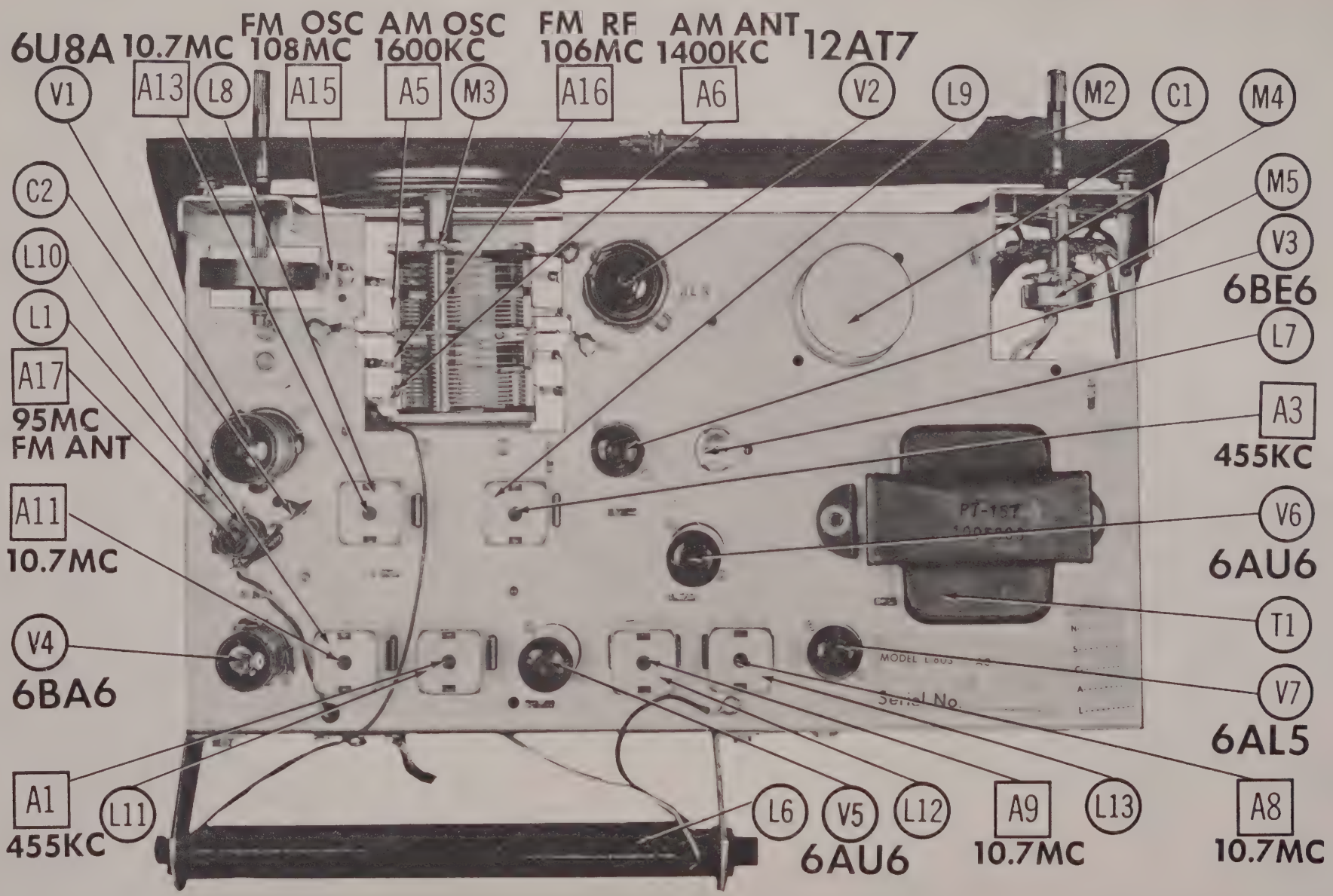
H647R

SET 438 FOLDER 11



CHASSIS TOP VIEW

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT
Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

AM ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
1.	.01mfd	High side to pin 7 (grid) of 6BE6 (V3). Low side to chassis.	455KC (400∿ Mod)	AM	Tuning gang fully open	DC probe to point (A). Common to chassis.	A1, A2, A3, A4	Adjust for maximum deflection.
2.	"	High side to AM antenna terminal. Low side to chassis.	1600KC	"	1600KC	"	A5	"
3.	"	"	1400KC	"	Tune to 1400KC signal	"	A6	"

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
4.	200mmf	High side to pin 1 (grid) of 6AU6 (V6). Low side to chassis.	10.7MC (Unmod)	FM	Point of non-interference	DC probe thru 1meg to point (B). Common to chassis.	A7	Adjust for maximum deflection.
5.	"	"	"	"	"	DC probe to point (C). Common to chassis.	A8	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.
6.	"	High side to pin 9 (grid) of 6U8 (V1). Low side to chassis.	"	"	"	DC probe thru 1meg to point (B). Common to chassis.	A9, A10, A11, A12, A13, A14	Adjust for maximum deflection.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.								
	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
4.	200mmf	High side to pin 1 (grid) of 6AU6 (V6). Low side to chassis.	10.7MC (450KC Swp)	FM	Point of non-interference	Vert. Amp. thru 1meg to point (B). Low side to chassis.	A7	Adjust for curve of maximum amplitude and symmetry similar to Fig. 1.
5.	"	"	"	"	"	Vert. Amp. to point (C). Low side to chassis.	A8	Adjust so that 10.7MC occurs at center of crossover lines similar to Fig. 2. SLIGHTLY retouch A7 for maximum amplitude and straightness of crossover lines.
6.	"	High side to pin 9 (grid) of 6U8 (V1). Low side to chassis.	"	"	"	Vert. Amp. thru 1meg to point (B). Low side to chassis.	A9, A10, A11, A12, A13, A14	Adjust for curve of maximum amplitude and symmetry similar to Fig. 1.

FM RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
7.	270Ω Carbon Resistor	High side thru 270Ω to FM antenna terminal. Low side to chassis.	108MC (Unmod)	FM	108MC	DC probe thru 1meg to point (B). Common to chassis.	A15	Adjust for maximum deflection.
8.	"	"	106MC	"	Tune to 106MC signal	"	A16	"

FIG. 1

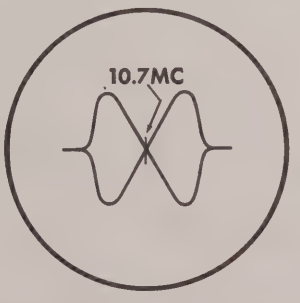
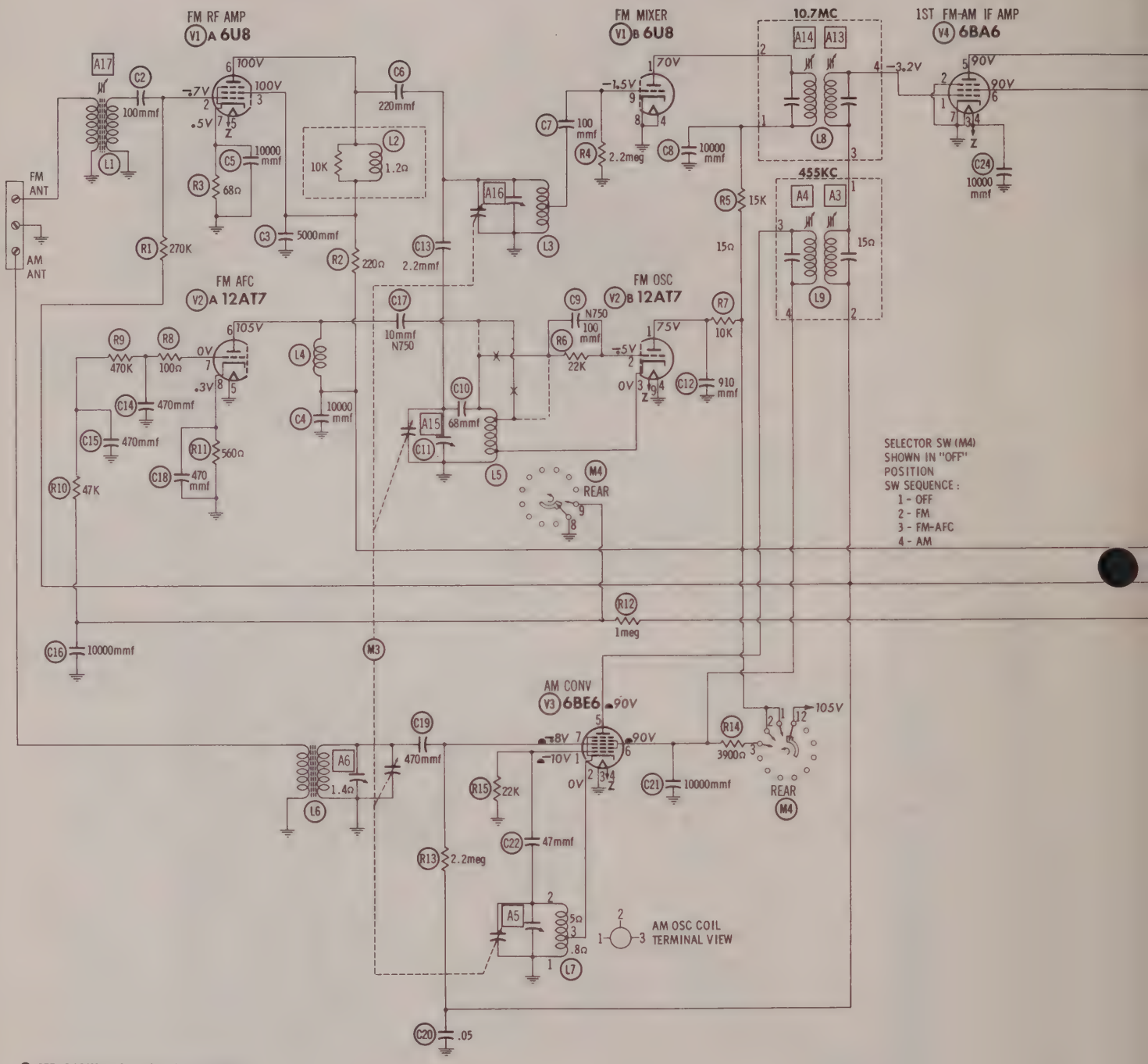


FIG. 2



Ⓔ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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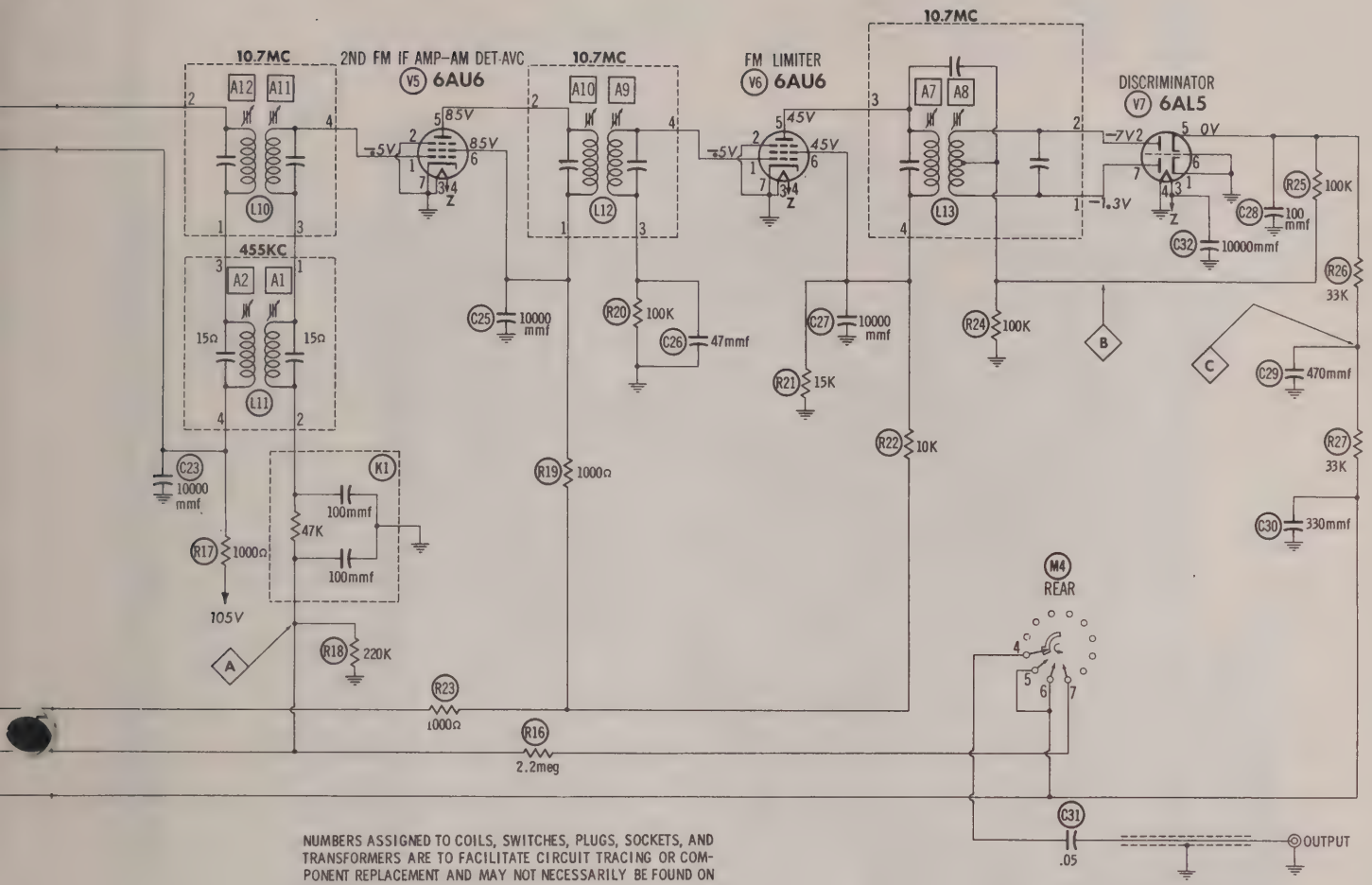
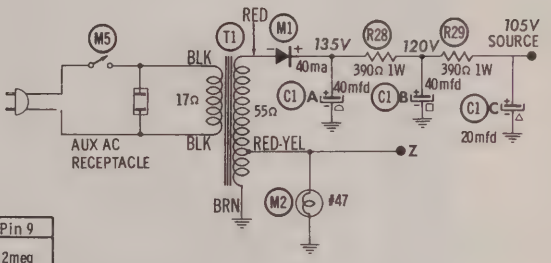


NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

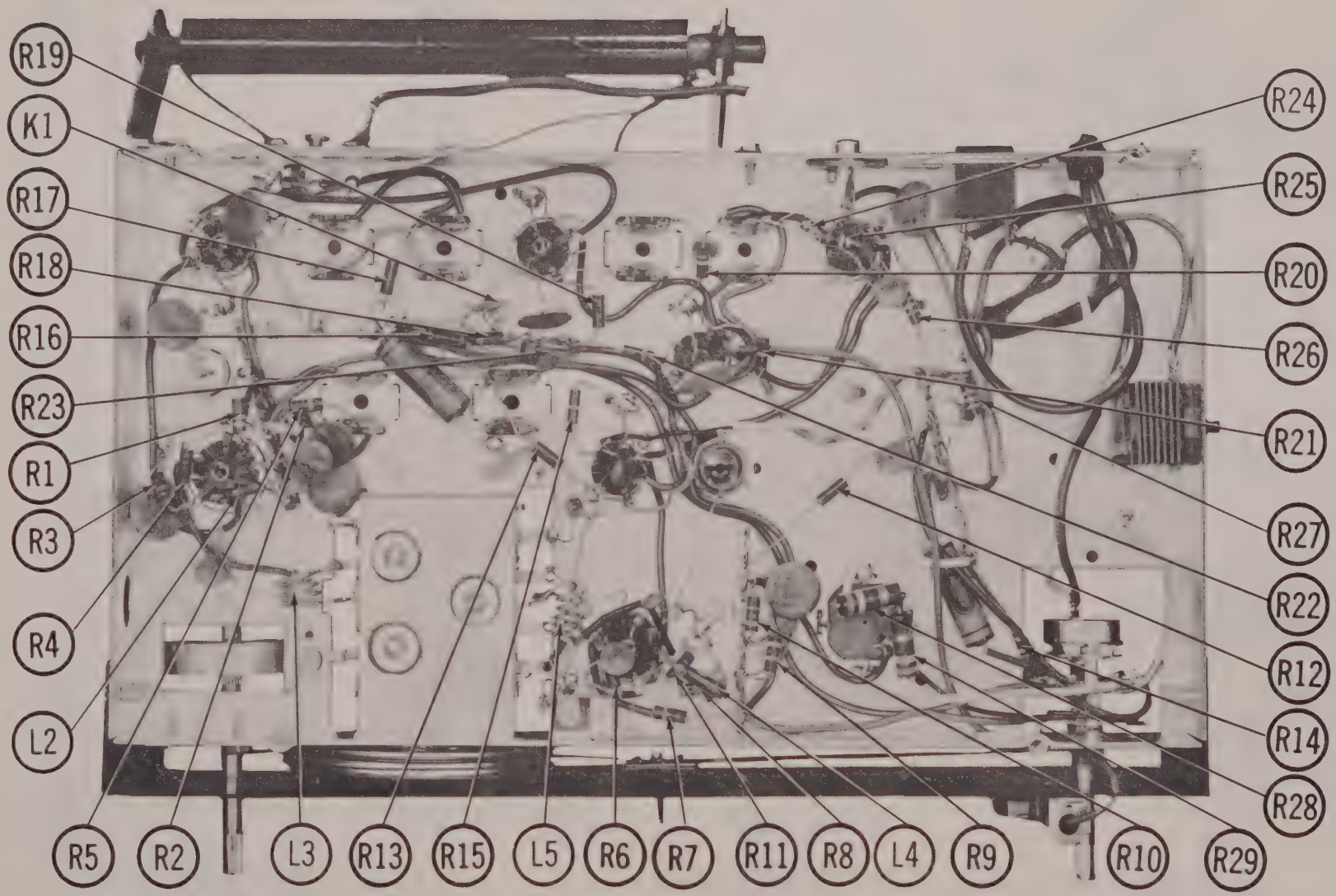


RESISTANCE READINGS

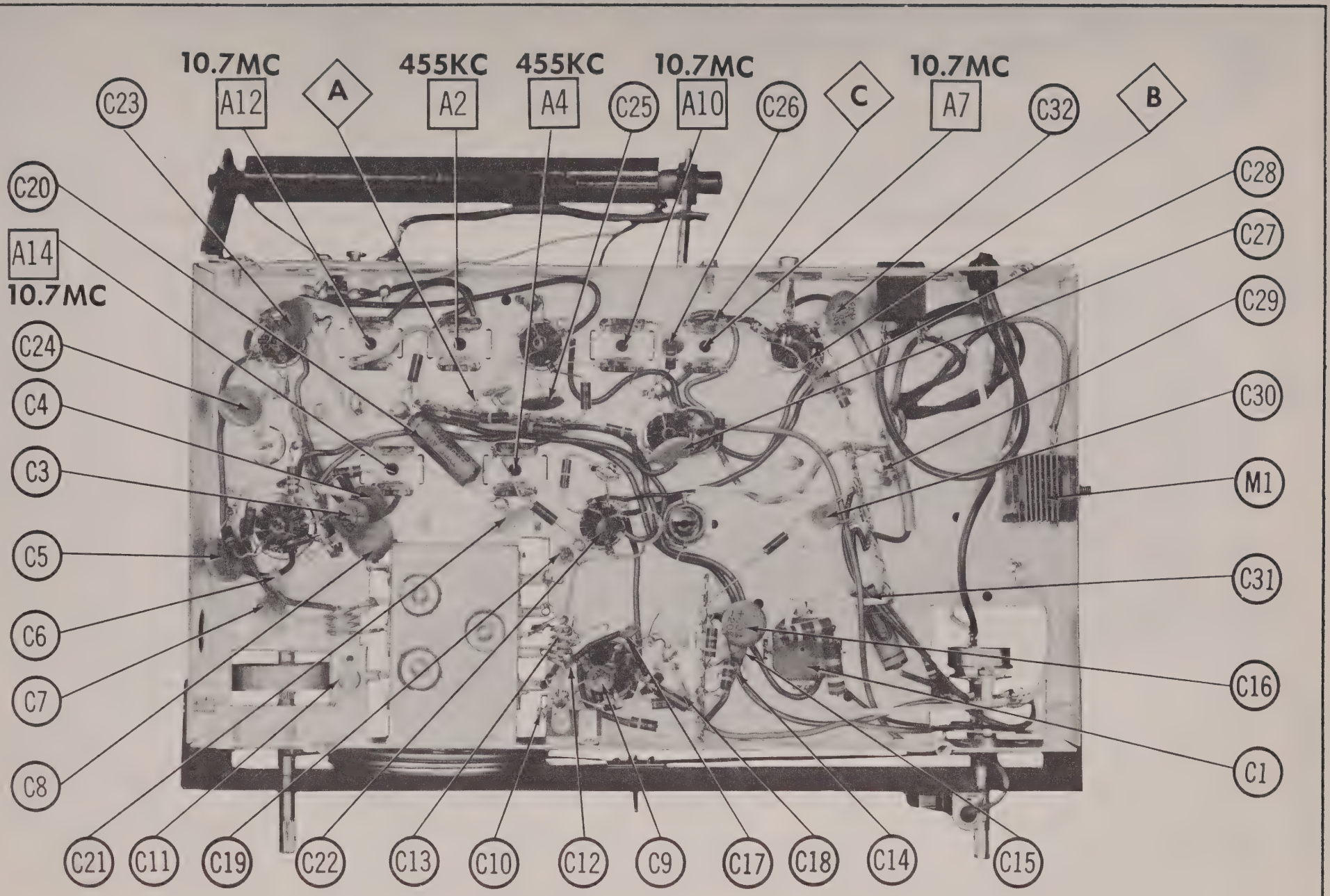
ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6U8A	†15K	2.7meg	†1000Ω	0Ω	.1Ω	†1000Ω	68Ω	0Ω	2.2meg
V2	12AT7	†10K	22K	0Ω	0Ω	0Ω	†800Ω	520K	560Ω	.1Ω
V3	6BE6	▪22K	▪.8Ω	0Ω	.1Ω	†▪4700Ω	†▪4700Ω	▪4.6meg		
V4	6BA6	2.4meg	0Ω	0Ω	.1Ω	†1800Ω	†1800Ω	0Ω		
V5	6AU6	260K	0Ω	0Ω	.1Ω	†2800Ω	†2800Ω	0Ω		
V6	6AU6	100K	0Ω	0Ω	.1Ω	†10K	†10K	0Ω		
V7	6AL5	0Ω	100K	.1Ω	0Ω	160K	0Ω	100K		

ALL MEASUREMENTS TAKEN IN "FM" POSITION UNLESS OTHERWISE DESIGNATED.
† MEASURED FROM OUTPUT OF M1
▪ MEASURED IN "AM" POSITION

LAFAYETTE
MODEL LT-25



CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION



CHASSIS BOTTOM VIEW - ALIGN, CAPACITOR & MISC IDENT

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	FM RF Amp.-FM Mixer	6U8A	
V2	FM Osc.-FM AFC	12AT7	
V3	AM Converter	6BE6	
V4	1st FM-AM IF Amplifier	6BA6	
V5	2nd FM IF Amp. - AM Det. - AVC	6AU6	
V6	FM Limiter	6AU6	
V7	Discriminator	6AL5	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	LAFAYETTE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	▲40	200	E-212-4	AFHS3-94	C0150	FP320	TMT-19	T-085	R2677*
B	■40	200			BR3025	TC55	TD-30-250	MT-4530	
C	▲20	200							

* Non-Catalog Item

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	LAFAYETTE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	100			BPD-0001	DD-101	L10T1	UC-531	5GA-T1	
C3	5000			BPD-005	DD-502	BYA10D5	DC525	5HK-D5	
C4	10000			BPD-01	DD-103	BYA6S1	DC511	5HK-S1	
C5	10000			BPD-01	DD-103	BYA6S1	DC511	5HK-S1	
C6	220			BPD-00022	DD-221	L10T22	UC-5322	5GA-T22	
C7	100			BPD-0001	DD-101	L10T1	UC-531	5GA-T1	
C8	10000			BPD-01	DD-103	BYA6S1	DC511	5HK-S1	
C9	100			N750-DI00	DTN-100	C10T1U	NT-531	5TCU-T1	N750
C10	68			SI68	D6-680	LT6Q68	UC-5468	5GA-Q68	
C11			TC-223-1						
C12	910								
C13	2.2			NPO-SI2.2	TCZ-2R2	CTA6V22C		5TCCB-V22	
C14	470			BPD-00047	DD-471	BYA10T47	UC-5347	5GA-T47	
C15	470			BPD-00047	DD-471	BYA10T47	UC-5347	5GA-T47	
C16	10000			BPD-01	DD-103	BYA6S1	DC511	5HK-S1	
C17	10			N750-DI10	DTN-10	C10Q1U	NT-541	5TCU-Q1	N750
C18	470			BPD-00047	DD-471	BYA10T47	UC-5347	5GA-T47	
C19	470			BPD-00047	DD-471	BYA10T47	UC-5347	5GA-T47	
C20	.05	200		P288N-05	DF-503	CUB2S5	GEM-415	2TM-S5	
C21	10000			BPD-01	DD-103	BYA6S1	DC511	5HK-S1	
C22	47			BPD-000047	DD-470	L10Q47	UC-5447	5GA-Q47	
C23	10000			BPD-01	DD-103	BYA6S1	DC511	5HK-S1	
C24	10000			BPD-01	DD-103	BYA6S1	DC511	5HK-S1	
C25	10000			BPD-01	DD-103	BYA6S1	DC511	5HK-S1	
C26	47			BPD-000047	DD-470	L10Q47	UC-5447	5GA-Q47	
C27	10000			BPD-01	DD-103	BYA6S1	DC511	5HK-S1	
C28	100			BPD-0001	DD-101	L10T1	UC-531	5GA-T1	
C29	470			BPD-00047	DD-470	L10Q47	UC-5347	5GA-T47	
C30	330			BPD-00033	DD-330	L10T33	UC-5333	5GA-T33	
C31	.05	200		P288N-05	DF-503	CUB2S5	GEM-415	2TM-S5	
C32	10000			BPD-01	DD-103	BYA6S1	DC511	5HK-S1	

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		LAFAYETTE PART No.	NOTES
	OHMS	WATT		
R1	270K			
R2	220Ω			
R3	68Ω			
R4	2.2meg			
R5	15K			
R6	22K			
R7	10K			
R8	100Ω			
R9	470K			
R10	47K			
R11	560Ω			
R12	1meg			
R13	2.2meg			
R14	3900Ω			
R15	22K			
R16	2.2meg			
R17	1000Ω			
R18	220K			
R19	1000Ω			
R20	100K			
R21	15K			
R22	10K			
R23	1000Ω			
R24	100K			
R25	100K			
R26	33K			
R27	33K			
R28	390Ω	1		
R29	390Ω	1		

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					
		LAFAYETTE PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	NOTES
L1	FM Ant. Trans.	1102-3					
L2	RF Choke	1104-4		SW-631 *			4.7 Microhenries; wound on a 10K resistor
L3	FM RF Coil	1100-3					
L4	RF Choke	1104-3	19-1002	BC-563	4606		2.7 Microhenries
L5	FM Osc. Coil	O-156-5					
L6	Loop Stick	L-155B-3					
L7	AM Osc. Coil	1101-3					
L8	1st FM IF	1038-5	16-3487	FM-254	1463		
L9	1st AM IF	I-110	16-6758	BC-352	12-C1	RF-1	
L10	2nd FM IF	1038-5	16-3487	FM-254	1463		
L11	2nd AM IF	I-110	16-6758	BC-353	12-C2	RF-2	
L12	3rd FM IF	1038-5	16-3487	FM-254	1463		
L13	Discriminator	1038-2	17-3491	FM-253	1464		

* Parallel with 10K Resistor.

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA							
	PRI.	SEC. 1	SEC. 2	LAFAYETTE PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	117V @ .28A	120V @ .040A Tap @ 6.3V @ 2.3A		PT-157A	P9102	P-3045		PA8421	26R38	R-30X	

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	LAFAYETTE PART No.	REPLACEMENT DATA	
K1	Diode RF Filter	100mmf, 100mmf, 47K		Aerovox	PA-97-1
				Centralab	PC-50
				Cornell-Dubilier	111TM1
				Sprague	D-1

SELENIUM RECTIFIER

ITEM No.	RATING	REPLACEMENT DATA				NOTES
	CURRENT (Measured)	LAFAYETTE PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	SARKES TARZIAN PART No.	
M1	.04A	8018-B-3	1234AH	RS075	75 M150 ①	① Silicon Type

MISCELLANEOUS

ITEM No.	PART NAME	LAFAYETTE PART No.	NOTES
M2	Lamp		#47
M3	Tuning Cap.	V-222B-2	4 Gang (AM Sections: Ant. 12-247mmf, Osc. 13-122mmf)
M4	Switch	8089-3	Selector, Four position, Three pole rotary wafer
M5	Switch		Power On-Off, Rotary Snap Switch

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

PHOTOFACT* Folder

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

ROLAND MODEL 71-384 (W100)

ROLAND MODEL
71-384 (W100)

TRADE NAME	Roland Model 71-384 (W100)
MANUFACTURER	Roland Radio Corp., 2-30 Anderson Ave., Mount Vernon, N. Y.
TYPE SET	Three Power Portable BC-SW Receiver
TUBES (Five)	Types 1U4 RF Amplifier, 1L6 Converter, 1U4 IF Amplifier, 1U5 Det.-AVC-AF Amp., 3V4 Output
POWER SUPPLY	105-125 Volts AC-DC (or) 7.5 Volts "A" Supply & 90 Volts "B" Supply in Pack Form
RATING	.16 Amp. @ 117 Volts AC (or) 46MA @ 7.5 Volts DC & 14MA @ 90 Volts DC
TUNING RANGE—BROADCAST	540-1620KC SHORT WAVE 5.8 - 18.3 MC

ROLAND MODEL
71-384 (W100)

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use battery power, if possible. If AC power is used, use an isolation transformer when available. If not, connect a .1mfd capacitor in series with low side of the signal generator and B-.
Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1mfd	High side to pin 6 (grid) of 1L6 (V2). Low side to B-.	455KC (400∿ Mod)	BC	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output. If AC power is used without an isolation transformer, reduce dummy antenna to 200mmf to reduce hum modulation.
	Set signal generator to 19.3MC for image frequency. If image fails to appear, set signal generator to 18.4MC. Decrease capacity of A5 until signal appears. Recheck for image.							
2.	.1mfd	High side to pin 6 (grid) of 1L6 (V2). Low side to B-.	18.4MC	SW	Tuning gang fully open	Across voice coil	A5	Set A6 and A7 to maximum capacity. Adjust A5 for maximum output using peak signal obtained with screw farthest out.
3.		Loop	17MC	"	17MC	"	A6, A7	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
4.		"	1620KC	BC	Tuning gang fully open	"	A8	"
5.		"	1400KC	"	1400KC	"	A9, A10	"
6.		"	600KC	"	600KC	"	A11	Fashion loop of several turns of wire and radiate signal into loop of receiver while rocking tuning gang. Repeat steps 4, 5 and 6.

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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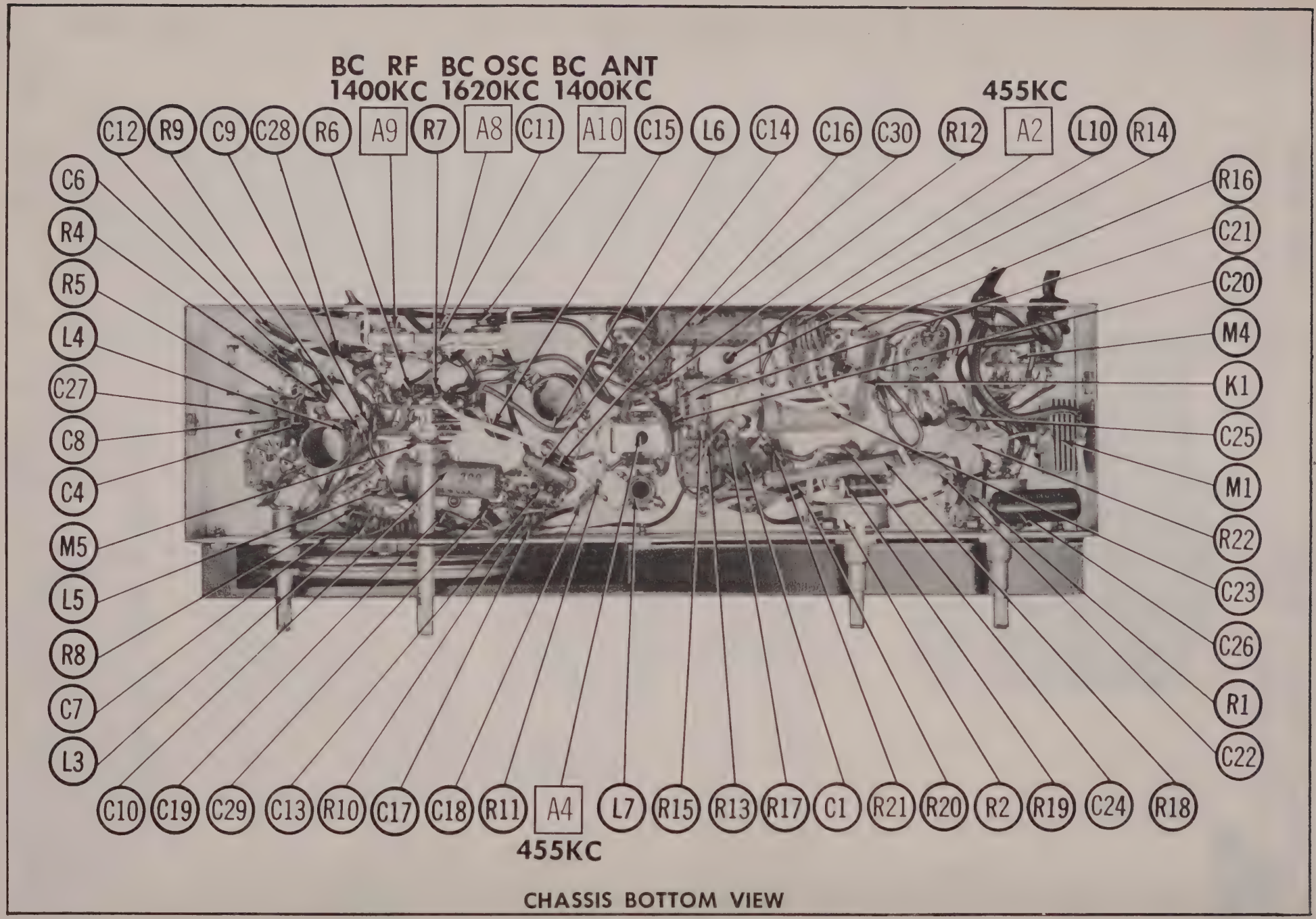
SET 438 FOLDER 12



CHASSIS BOTTOM VIEW

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	RF Amp.	1U4	
V2	Converter	1L6	
V3	IF Amp.	1U4	

ITEM No.	USE	TYPE	NOTES
V4	Det.-AVC-AF Amp.	1U5	
V5	Output	3V4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA ROLAND PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	▲50	150	584005	AFH4-38	D0330	FP412.2 TT15X20	TMQ-37	Q-125	TVL-4425.3
B	■40	150							
C	▲40	150							
D	100	15							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

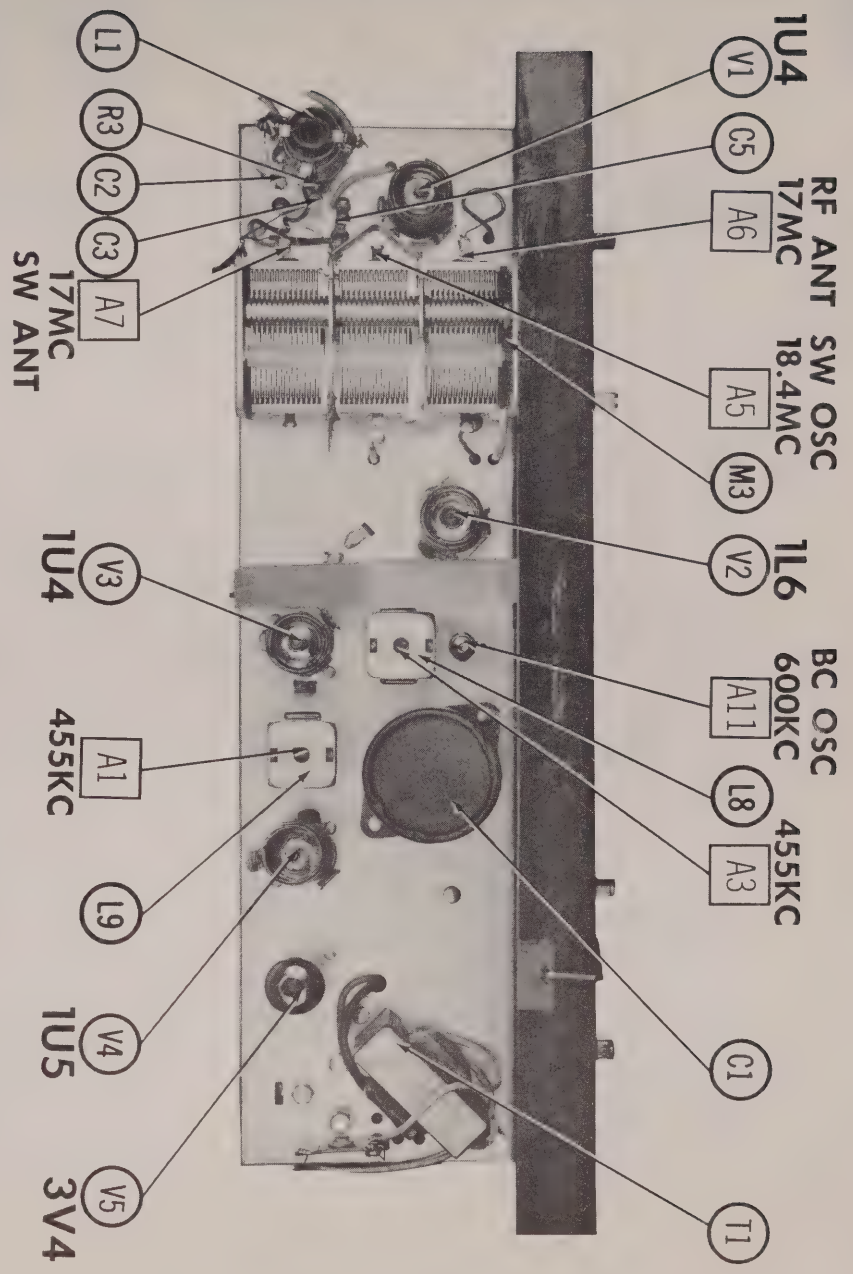
ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA ROLAND PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C2	3.3			NPO-SI 3.3	TCZ-3R3	CTA6V33C	ZT-5533	5TCCB-V33	
C3	6.8			NPO-SI 6.8	TCZ-6R8	CTA6V68C	ZT-5568	5TCCB-V68	
C4	10000			BPD-01	DD-103	BYA6SI	DC511	5HK-SI	
C5	100			SI 100	D6-101	LT6T1	UC-531	5GA-T1	
C6	2200			DI-0022	DD-222	BYA10D22	UC-5222	5GA-D22	
C7	10000			BPD-01	DD-103	BYA6SI	DC511	5HK-SI	
C8	10000			BPD-01	DD-103	BYA6SI	DC511	5HK-SI	
C9	6.8			NPO-SI 6.8	TCZ-6R8	CTA6V68C	ZT-5568	5TCCB-V68	
C10	.1	200		P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	
C11A									
B									
C									
C12	10000			BPD-01	DD-103	BYA6SI	DC511	5HK-SI	
C13	.33								
C14	50			SI 50	D6-500	LT6Q5	GP-545	5GA-Q5	
C15	4000						MCE463		2%
C16	575								5%
C17	10000			BPD-01	DD-103	BYA6SI	DC511	5HK-SI	
C18	5000			BPD-005	DD-502	BYA10D5	DC525	5HK-D5	
C19	10000			BPD-01	DD-103	BYA6SI	DC511	5HK-SI	
C20	2200			DI-0022	DD-222	BYA10D22	UC-5222	5GA-D22	
C21	.1	200		P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	
C22	100			SI 100	D6-101	LT6T1	UC-531	5GA-T1	
C23	.05	200		P288N-05	DF-503	CUB2S5	GEM-415	2TM-S5	
C24	1000			BPD-001	DD-102	BYA6D1	DC521	5HK-D1	
C25	2200			DI-0022	DD-222	BYA10D22	UC-5222	5GA-D22	
C26	.05	400		P488N-05	DF-503	CUB4S5	GEM-415	4TM-S5	
C27	5000			BPD-005	DD-502	BYA10D5	DC525	5HK-D5	
C28	2200			DI-0022	DD-222	BYA10D22	UC-5222	5GA-D22	
C29	2200			DI-0022	DD-222	BYA10D22	UC-5222	5GA-D22	
C30	.1	200		P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA ROLAND PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1meg	½	361082	B-70	A47-1meg-Z	QI3-137	U53	Volume, with 150K stop
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
C	Switch			KB-2 or KR-2*	SWE-20	76-2	US-27	
R2A	2meg	½	361100	B-76	A47-2meg-Z	QI3-139	U55	Tone
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	

* Use KR with CRL "red label" controls and KB with "blue label" controls.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	ROLAND PART No.	NOTES
R3	47K			
R4	2.7meg			
R5	3.9meg			Note 1
R6	27K			
R7	1000Ω			
R8	1000Ω			
R9	47K			
R10	180K			
R11	68K			
R12	200Ω			Note 2
R13	1meg			
R14	6.8meg			
R15	1500Ω			
R16	1500Ω			
R17	1800Ω			
R18	3300Ω	3(WW)		
R19	4700Ω	2		
R20	470Ω	1		
R21	82Ω			
R22	100Ω	2.5 (WW)	510023	Fuse type

Note 1. Some versions may use 3.3meg in this application. (Part #483351).
Note 2. Some versions may use 220Ω in this application. (Paart #482211).

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA ROLAND PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	NOTES
L1	SW Ant. Coil	455070					
L2	Loop Ant.	460032					Includes cabinet back
L3	Fil. Choke	474612	19-1007	BC-561	4602		1 Microhenry
L4	SW RF Coil	455068					
L5	BC RF Coil	455065	19-4201	TV-197	6154	VP-5	190 Microhenries
L6	SW Osc. Coil	455022					
L7	BC Osc. Coil	455066	14-1077	BC-393 *	69-OSC *		
L8	Input IF	450009	16-6758	BC-352	12-C7	RF-1	
L9	Output IF	450003	16-6758	BC-353	12-C8	RF-2	
L10	RF Choke	474611	19-3001	TV-189	6175	VP-9	.8 Microhenry

* Disregard capacity winding.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA ROLAND PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T1	9500Ω	1-2Ω	430460	Z1000	A-2900	AU-608	A-3848	24860	S-51X	

SPEAKER

ITEM No.	TYPE SIZE	TYPE FIELD	TYPE V. C. IMP.	REPLACEMENT DATA ROLAND PART No.	REPLACEMENT DATA QUAM PART No.	NOTES
SP1	4"	PM	3-4Ω	404003	4A07	Parallel and phase
SP2	4"	PM	3-4Ω	404003	4A07	

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	ROLAND PART No.	REPLACEMENT DATA	
K1	Audio Coup. Net.	2000mmf, 150mmf, 10000mmf, 150mmf, 5000mmf, 10meg, 4.7meg, 1meg, 3.3meg	420007	Aerovox Centralab Sprague	PA-521 PC-165 DP-1

SELENIUM RECTIFIER

ITEM No.	RATING CURRENT (Measured)	REPLACEMENT DATA ROLAND PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	SARKES TARZIAN PART No.	NOTES
M1	.06A	380016	1234AH	RS075	75 M150 ①	① Silicon Type.

BATTERIES

ITEM No.	VOLTAGE	ROLAND PART No.	REPLACEMENT DATA BURGESS "A-B" Pack	EVEREADY "A-B" Pack	MALLORY "A-B" Pack	NOTES
M2	7.5V "A" 90V "B"	4-D-138	T6Z60	756	M-405	

MISCELLANEOUS

ITEM No.	PART NAME	ROLAND PART No.	NOTES
M3	Tuning Cap.	590048	3 Gang (Ant. 15-465mmf, RF 15-465mmf, Osc. 15-465mmf)
M4	Switch	370041	AC-DC Battery, Rotary wafer type
M5	Switch	370040	Band, Rotary wafer type

CABINETS & CABINET PARTS

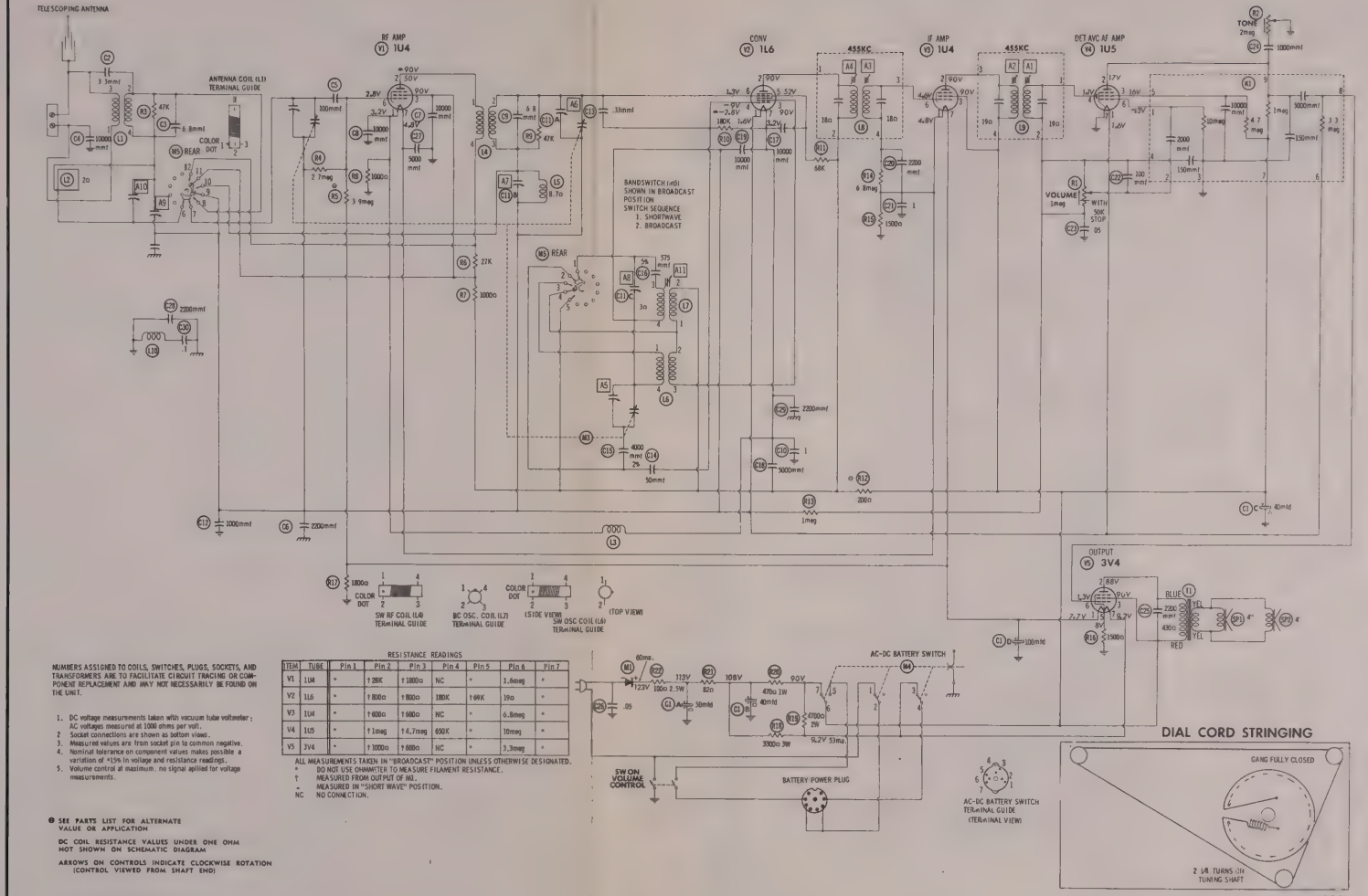
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	270150	4 Used
Case	230920	
Dial Window	260053	
Dial Pointer	674038	
Dial Pan	760882	
Antenna	464025	Telescoping

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	1U4	*	†.28K	†1800Ω	NC	*	1.6meg	*
V2	1L6	*	†.8ΩΩ	†.8ΩΩ	180K	†69K	19Ω	*
V3	1U4	*	†.6ΩΩ	†.6ΩΩ	NC	*	6.8meg	*
V4	1U5	*	†1meg	†4.7meg	650K	*	10meg	*
V5	3V4	*	†1ΩΩΩ	†.6ΩΩ	NC	*	3.3meg	*

ALL MEASUREMENTS TAKEN IN "BROADCAST" POSITION UNLESS OTHERWISE DESIGNATED.
* DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE.
† MEASURED FROM OUTPUT OF M3.
- MEASURED IN "SHORT WAVE" POSITION.
NC NO CONNECTION.

NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
5. Volume control at maximum, no signal applied for voltage measurements.

● SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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DIAL CORD STRINGING

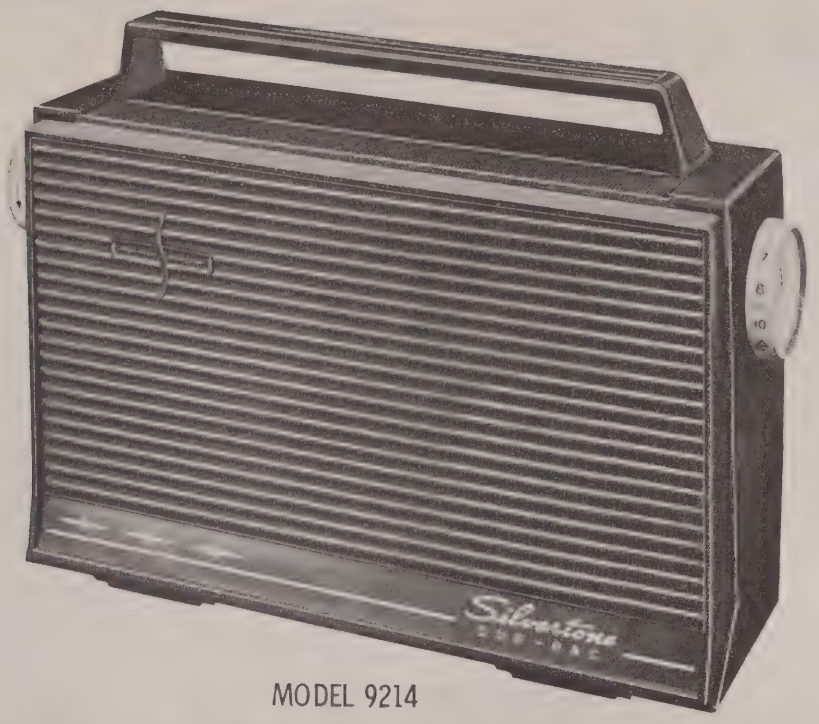
ROLAND MODEL 71-384 (W100)

PHOTOFACT* Folder with CIRCUITRACE*

EIA MEMBER

SILVERTONE MODELS 9214, 9215, 9217A, 9218A (Ch. 528.53350)

SILVERTONE MODELS 9214, 9215, 9217A, 9218A (Ch. 528.53350)



MODEL 9214

TRADE NAME	Silvertone Models 9214, 9215, 9217A, 9218A (CH. 528.53350)
SUPPLIER	Sears, Roebuck & Co., 925 S. Homan Ave., Chicago, Illinois
TYPE SET	Three Power Portable AM Receiver
TUBES	
POWER SUPPLY	110-120 Volts AC-DC (or) 7.5 Volts DC "A" Supply & 67.5 Volts DC "B" Supply
RATING	9 Watts, .14 Amp. @117 Volts AC (or) 22MA@7.5 Volts DC & 56MA@67.5 Volts DC
TUNING RANGE—BROADCAST	540 - 1620KC

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use battery power, if possible. If AC power is used, use an isolation transformer when available. If not, connect a .1mfd capacitor in series with low side of the signal generator and B-.
Volume control should be at maximum position. Output of signal should be no higher than necessary to obtain an output reading.

Suggested alignment tools:

A1, A2, A3, A4..... GENERAL CEMENT #2729, 5008, 8195, 8275, 8987, 8989, 9291
WALSCO #2520, 2531, 2532, 2534, 2537, 2538

A6..... GENERAL CEMENT #8282, 8606, 8606L
WALSCO #2543, 2544

A5, A7..... GENERAL CEMENT #5003, 5004, 5008, 5015, 5016, 8195, 8290, 8607, 8609, 8821, 8987, 9105, 9106, 9291, 9294
WALSCO #2515, 2522, 2523, 2525, 2531, 2532, 2534, 2537, 2538

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1mfd	High side to pin 6 (grid) of 1R5 (V1). Low side to B-.	455KC (400~ Mod.)	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output. If AC power is used without an isolation transformer, reduce dummy antenna to 200mmf to reduce hum modulation.
2.	"	"	1625KC	"	"	A5	"
3.	"	"	600KC	600KC	"	A6	Adjust for maximum output while rocking tuning gang. Repeat steps 2 & 3.
4.		Loop	1400KC	Tune for 1400KC signal	"	A7	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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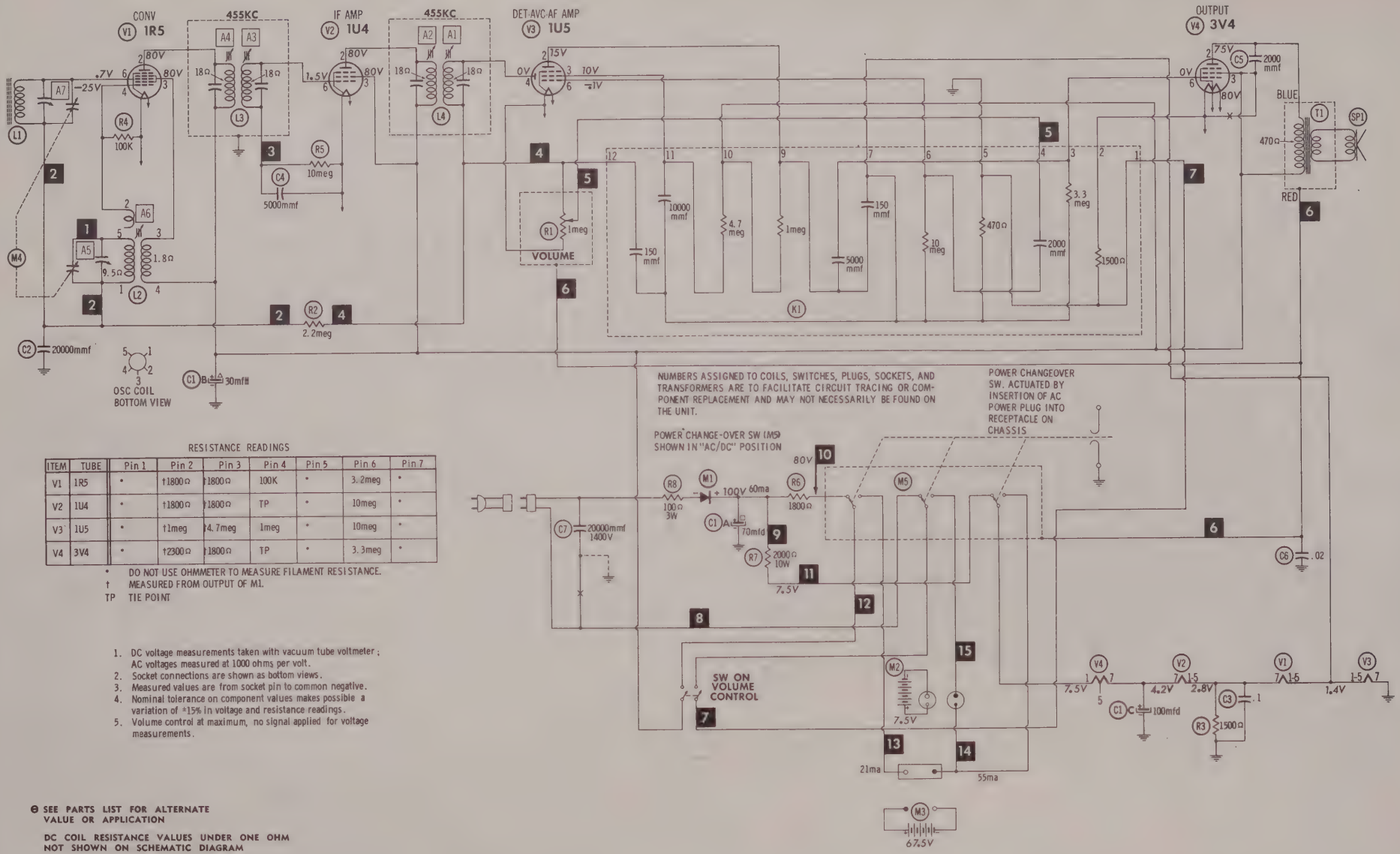

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	1R5	•	†1800Ω	†1800Ω	100K	•	3.2meg	•
V2	1U4	•	†1800Ω	†1800Ω	TP	•	10meg	•
V3	1U5	•	†1meg	†4.7meg	1meg	•	10meg	•
V4	3V4	•	†2300Ω	†1800Ω	TP	•	3.3meg	•

• DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE.
† MEASURED FROM OUTPUT OF M1.
TP TIE POINT

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
5. Volume control at maximum, no signal applied for voltage measurements.

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

A PHOTOFACT STANDARD NOTATION SCHEMATIC
with CIRCUITRACE®

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SILVERTONE MODELS 9214, 9215, 9217A, 9218A (Ch. 528.53350)

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Converter	1R5	
V2	IF Amplifier	1U4	
V3	Det. -AVC-AF Amp.	1U5	
V4	Output	3V4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA Silvertone PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	■70	150	18-54-5	AFH3-64-40		PFP302.38		PCL-3411	
B	▲30	150							
C	100	10							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	RATING TOL	REPLACEMENT DATA Silvertone PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C2	20000			15-20416	BPD-02	DD-203	BYB6S2	B-120	5HK-S2	
C3	.1	200		20-51-4	P288N-1	DF-104	BC2P1J	ACE401	2SE-P10	
C4	5000			15-50316	BPD-005	DD-502	BYA10D5	B-250	5HK-D5	
C5	2000			15-30216	BPD-002	DD-202	BYA10D2	B-220	5HK-D2	
C6	.02	400		16-20343	P488N-02	DD-203	CUB4S2	GEM-412	4TM-S2	
C7	20000	1400		20-82-0						

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA Silvertone PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1	1meg	½	24-310-0					Volume & Switch

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	Silvertone PART No.	NOTES
R2	2.2meg		60-22502	
R3	1500Ω		60-15201	
R4	100K		60-10401	
R5	10meg		60-10602	
R6	1800Ω		60-18201	
R7	2000Ω	10	61-23-0	
R8	160Ω	3	61-22-0	

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA Silvertone PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	NOTES
L1	Loopstick	82-143-0					
L2	Osc. Coil	10-45-4					
L3	Input IF	10-102-2	16-6780	BC-356	13-PC9	RF-4	
L4	Output IF	10-102-2	16-6780	BC-357	13-PC10	RF-4	

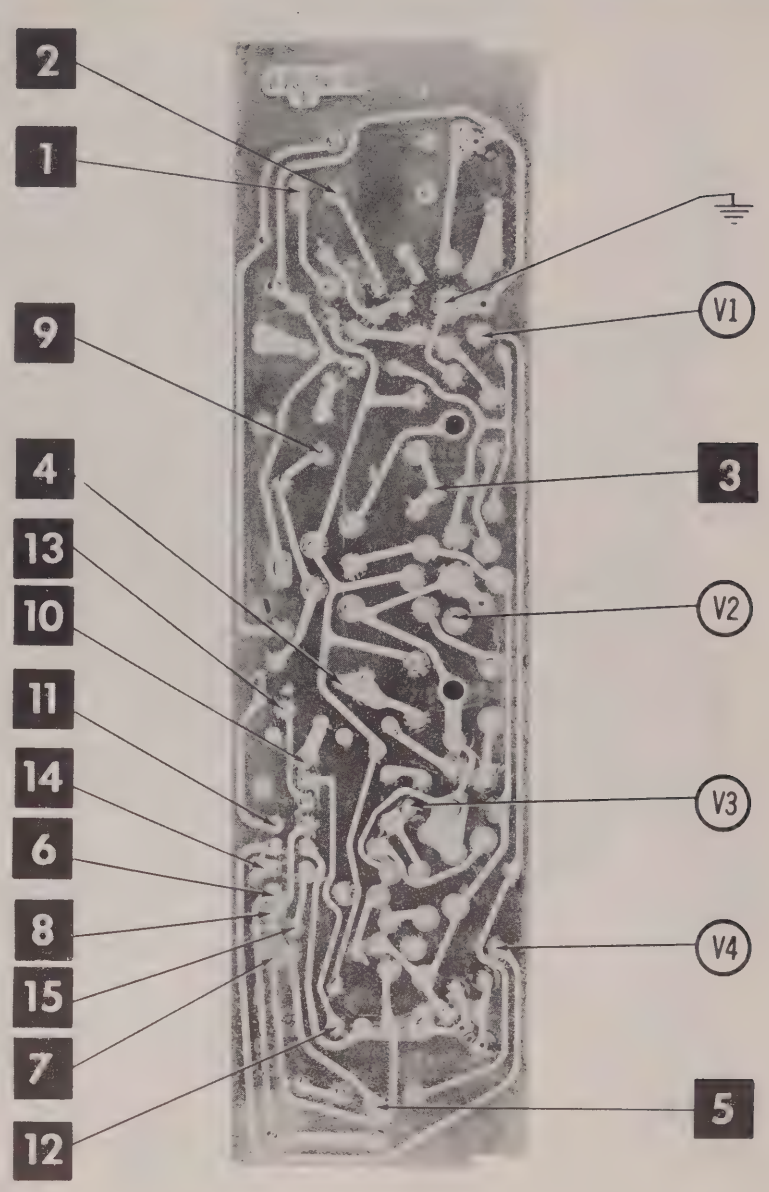
TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA Silvertone PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T1	9500Ω	3-4Ω	80-62-1		A-2998①		A-3329①	24S83①	S-11X ①	① Use original channel frame

PRINTED BOARD

A Howard W. Sams CIRCUITRACE* Photo

ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED



PARTS LIST & DESCRIPTION (continued)

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	Silvertone PART No.	QUAM PART No.	
SP1	3½"	PM	3-4Ω	33-357-4 ①	3A05	① Includes T1

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	Silvertone PART No.	REPLACEMENT DATA
K1	Audio Circuit	150mmf, 150mmf, 2000mmf, 5000mmf, 10000mmf, 470Ω, 1500Ω, 3.3meg, 1meg, 4.7meg, 10meg.	13-24-5	Sprague TC-1

SELENIUM RECTIFIER

ITEM No.	RATING	REPLACEMENT DATA				NOTES
	CURRENT (Measured)	Silvertone PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	SARKES TARZIAN PART No.	
M1	.058A	83-1112	1234AH	T065 SD-94 ①	55 K200 ①	① Silicon Type

BATTERIES

ITEM No.	VOLTAGE	Silvertone PART No.	REPLACEMENT DATA						NOTES
			BURGESS		EVEREADY		MALLORY		
			"A"	"B"	"A"	"B"	"A"	"B"	
M2	7.5	57-6444	C5		717		M9		
M3	67.5	57-6482		P45M					

MISCELLANEOUS

ITEM No.	PART NAME	Silvertone PART No.	NOTES
M4	Tuning Cap.	19-71-2	2 Gang
M5	Switch	69-275-0	Power Changeover, (3PDT, Spring Return, Slide Type)
	Printed Board	D25-14-1B	

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

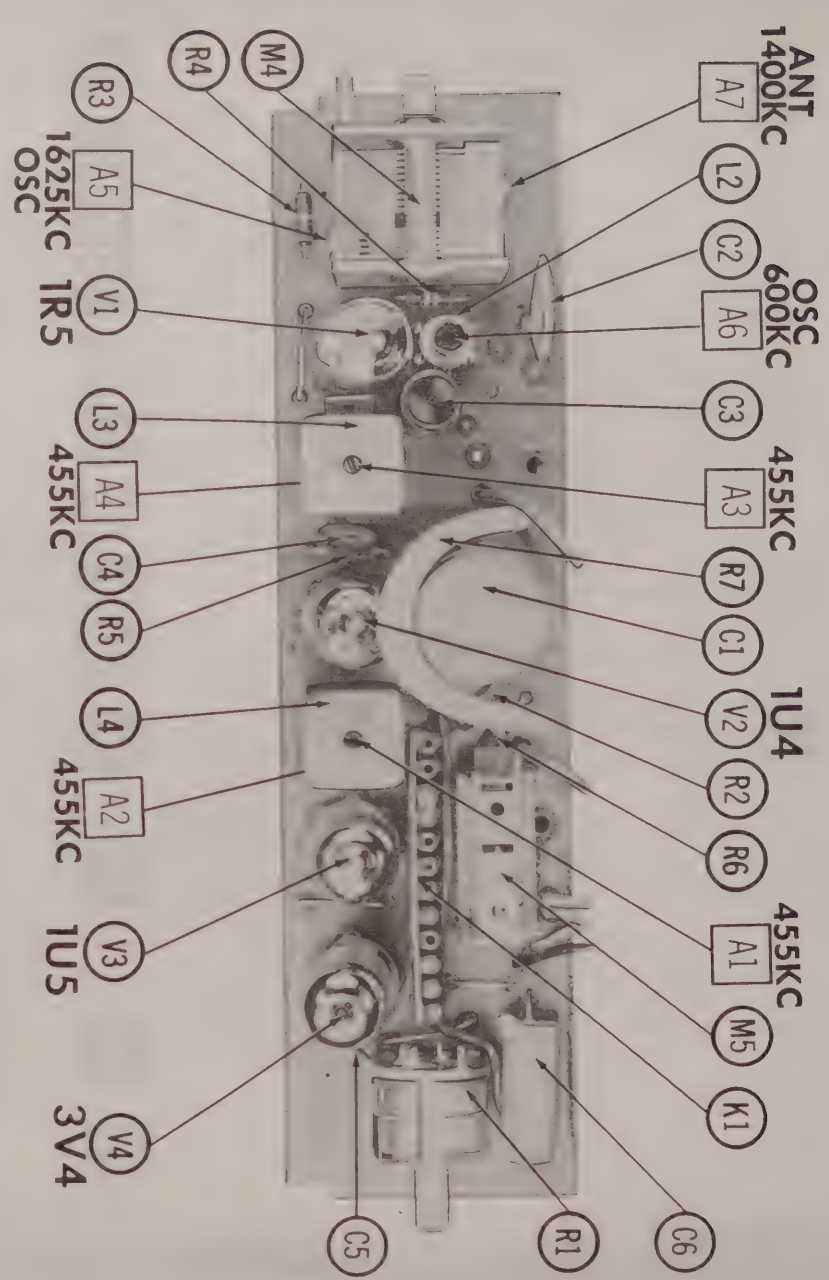
NAME	PART NO.	DESCRIPTION
Knob	52-1065-0	Tuning, Model 9214
Knob	52-1066-0	Tuning, Models 9215, 9217A, 9218A
Knob	52-1067-0	Volume-On-Off, Model 9214
Knob	52-1068-0	Volume-On-Off, Models 9215, 9217A, 9218A
Cabinet	42-57-1	Model 9214
Cabinet	42-58-1	Model 9215
Cabinet	42-62-1	Model 9217A
Cabinet	42-63-1	Model 9218A

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

CHASSIS—TOP VIEW



PHOTOFACT* Folder

STEELMAN MODELS 4A30, 4A33

STEELMAN MODELS
4A30, 4A33

MODEL 4A30

STEELMAN MODELS
4A30, 4A33

TRADE NAME	Steelman Models 4A30, 4A33
MANUFACTURER	Steelman Phono & Radio Co., Inc., 2-30 Anderson Ave., Mt. Vernon, N. Y.
TYPE SET	AC Operated Phono Amplifier With 4 Speed Automatic Record Changer
TUBES	Three
POWER SUPPLY	110 - 120 Volts AC, 60 Cycles RATING 24 Watts, .23 Amp. @117 Volts AC (Less Motor)

FOR SERVICE INFORMATION ON RECORD CHANGER PART #300035 - USED IN MODEL 4A30 - SEE V-M 959 - PHOTOFACT SET 396 FOLDER 13.
FOR SERVICE INFORMATION ON RECORD CHANGER PART #300032 USED IN MODEL 4A33 - SEE V-M 1200A - PHOTOFACT SET 353 FOLDER 16 OR RECORD CHANGER MANUAL RC-10.

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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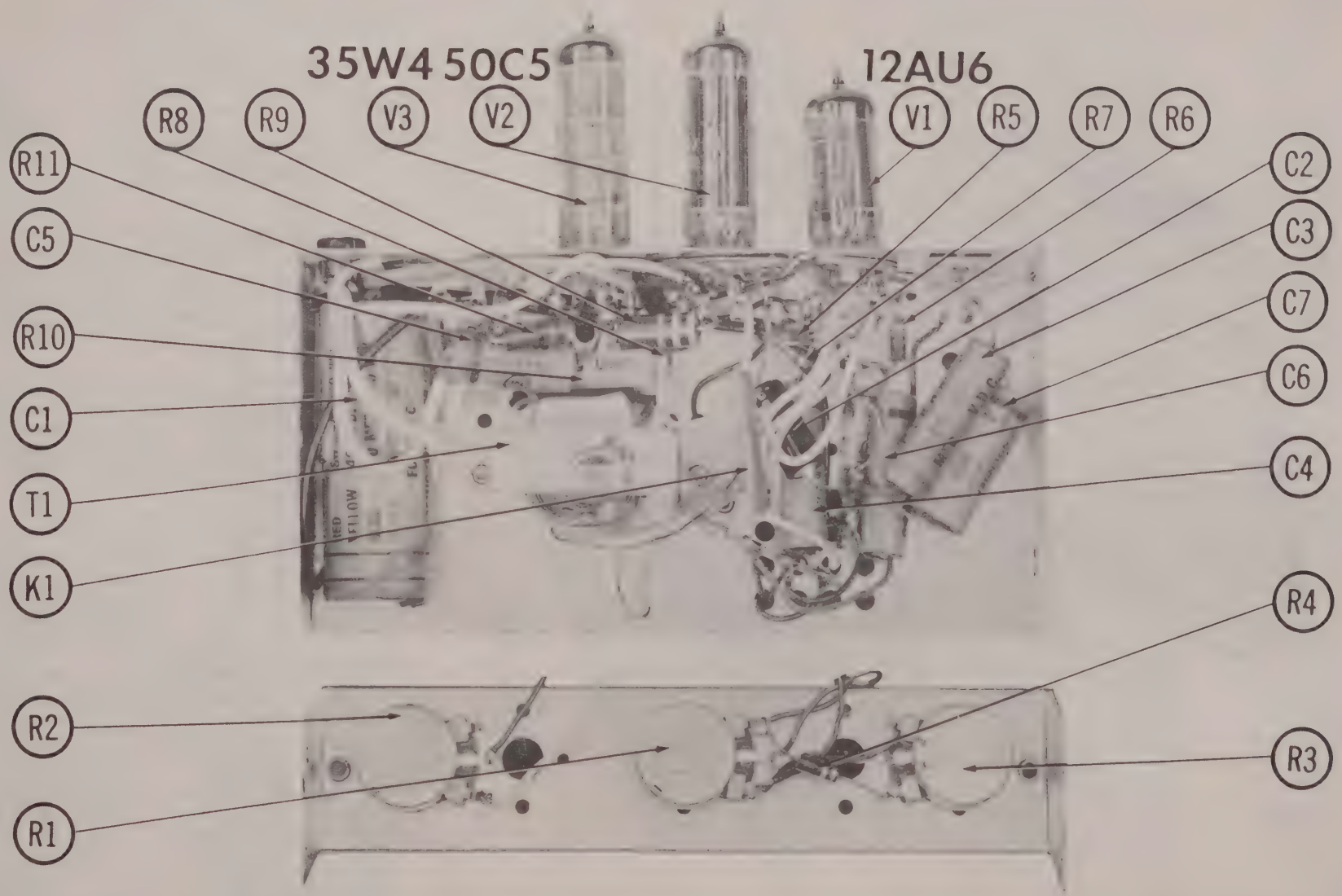
H787

SET 438 FOLDER 14



CHASSIS BOTTOM VIEW

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	AF Amplifier	12AU6	
V2	Output	50C5	
V3	Rectifier	35W4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA STEELMAN PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	40	150	583024	PRS150V/ 804020	BBRT84215	TCT3117	TDLT-7	FMT-339	TVA-3455
B	80	150							
C	20	150							
C2	10	50	581023	SRE50V10	BBR10-50	TT50X10	TD-10-50	MT-0510	TVA-1304

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA STEELMAN PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C3	.05	200		P288N-05	DF-503	CUB2S5	GEM-415	2TM-S5	
C4	.05	200		P288N-05	DF-503	CUB2S5	GEM-415	2TM-S5	
C5	.1	200		P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	
C6	.05	200		P288N-05	DF-503	CUB2S5	GEM-415	2TM-S5	
C7	.1	400		P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA STEELMAN PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	3.25meg	½	360320	B-862	A47-4meg-Z	Q13-140	U57	Loudness
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
R2A	7500Ω	½	360225	B-13	A47-7500S	Q11-115	U20	Treble
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
R3A	5meg	½	360330	B-88	A47-5meg-Z	Q13-141	U65	Bass
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	STEELMAN PART No.	NOTES
R4	100K			
R5	3300Ω			
R6	4700Ω			Note 1
R7	180Ω			Note 2
R8	2200Ω			
R9	330Ω	2		
R10	125Ω	5	510005	
R11	22Ω	1		

Note 1. Some versions may use 5000Ω in this application.

Note 2. Model 4A33 uses 150Ω in this application.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA STEELMAN PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T1	2700Ω	1-2Ω	430211	Z1001	A-2930	AU-601	A-3877	24S51	S-3X	

SPEAKER

ITEM No.	TYPE SIZE	TYPE FIELD	TYPE V. C. IMP.	REPLACEMENT DATA STEELMAN PART No.	REPLACEMENT DATA QUAM PART No.	NOTES
SP1	5"	PM	3-4Ω	405005	5A15	Parallel And Phase
SP2	5"	PM	3-4Ω	405005	5A15	

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	STEELMAN PART No.	REPLACEMENT DATA
K1	Audio Circuit	150mmf, 5000mmf, 10000mmf, 50000mmf, 470K, 470K, 4.7meg, 4.7meg.	420003	

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA STEELMAN PART No.	ASTATIC PART No. CARTRIDGE	ASTATIC PART No. NEEDLE	JENSEN PART No. CARTRIDGE	JENSEN PART No. NEEDLE	REMARKS
M1	322517	118-TS	N8-1 and N8-3			

ASTATIC NEEDLE LISTING SHOWN ABOVE IS SPECIFIED FOR THE RESPECTIVE REPLACEMENT CARTRIDGE LISTED. FOR ORIGINAL CARTRIDGE NEEDLE REPLACEMENT SEE BELOW.

PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA STEELMAN PART No.	JENSEN PART No.	WALCO PART No.	REMARKS
M2	329307 (78)	† CRA-55 or ♦ CRA-55D	† W-64S or ♦ W-64D	† Jewel ♦ Diamond
	329107 (LP)	† CRA-55LP or ♦ CRA-55LPD	† W-64MGS or ♦ W-64MGD	

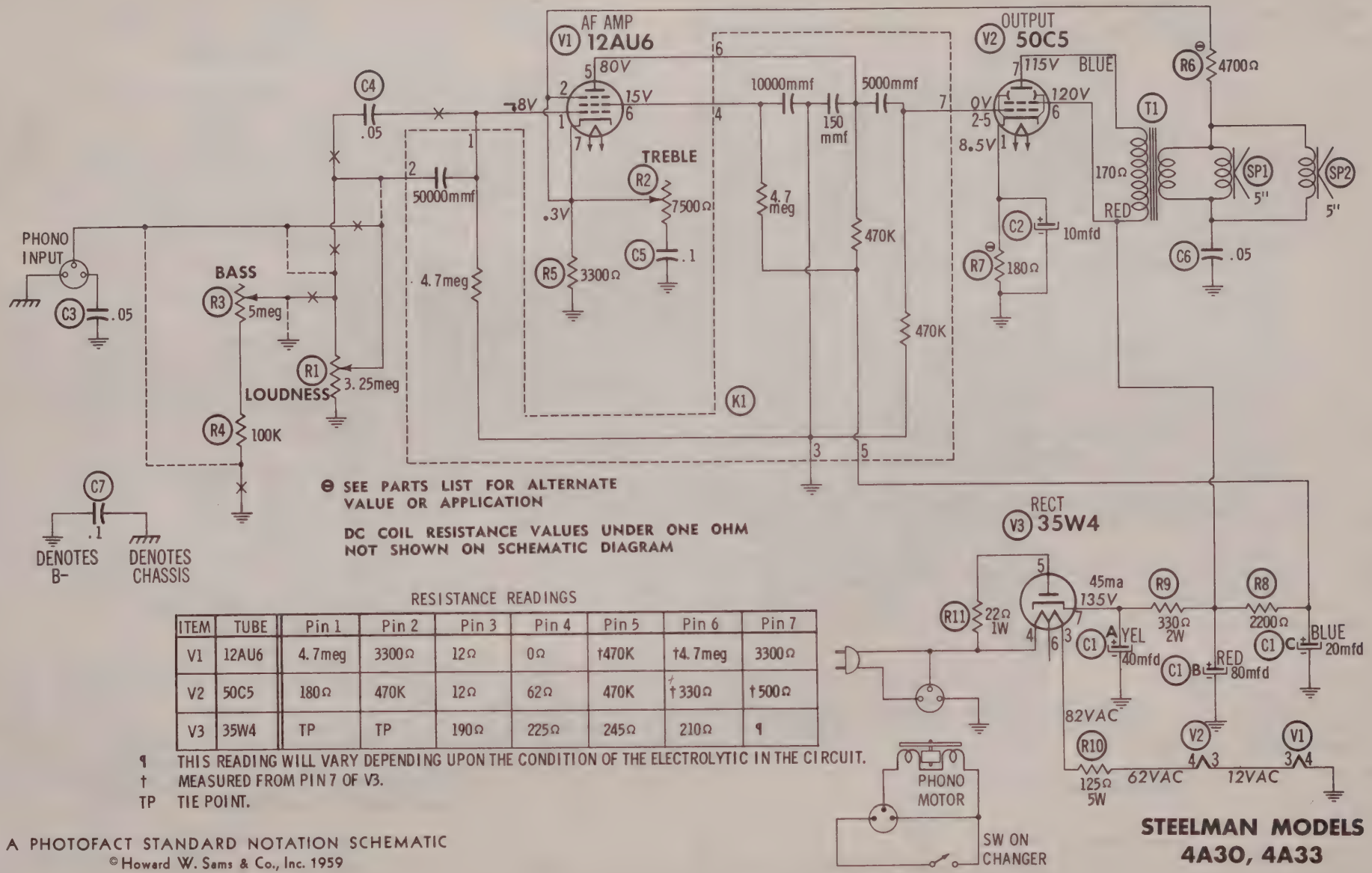
CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	270148	3 Used
Case	231020	Gray & White, Model 4A30
Case	231030	Coral & White, Model 4A30
Cabinet	210760	Mahogany, Model 4A33
Cabinet	210761	Blond, Model 4A33
Cabinet	210762	Walnut, Model 4A33
Cabinet	210763	Fruitwood, Model 4A33
Cabinet	210764	Ebony, Model 4A33

WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord	Use BELDEN No. 1765-B (6 Ft. Length) 1725-K (7½ Ft. Length)
Low-Loss Shielded Lead (Interconnecting)	Use BELDEN No. 8401
Phono Pick-up Arm Cable	Use BELDEN No. 8430 (Two Conductor - Twisted)



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	12AU6	4.7meg	3300Ω	12Ω	0Ω	†470K	†4.7meg	3300Ω
V2	50C5	180Ω	470K	12Ω	62Ω	470K	†330Ω	†500Ω
V3	35W4	TP	TP	190Ω	225Ω	245Ω	210Ω	¶

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
† MEASURED FROM PIN 7 OF V3.
TP TIE POINT.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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STEELMAN MODELS 4A30, 4A33

PHOTOFACT* Folder

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

SYMPHONIC MODEL 1270

SYMPHONIC
MODEL 1270

SYMPHONIC
MODEL 1270

TRADE NAME	Symphonic Model 1270
MANUFACTURER	Symphonic Radio & Electronics Corp., 235 Jersey Ave., New Brunswick, N.J.
TYPE SET	AC Operated AM Receiver with 4 Speed Manual Record Player
TUBES	Four
POWER SUPPLY	110-120 Volts AC, 60 Cycle
TUNING RANGE—BROADCAST	540-1650KC
RATING	25 Watts, .275 Amp. @ 117 Volts AC (Radio) 38Watts, .435 Amp. @ 117 Volts AC (Phono)

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer, if available. If not, connect a .1mfd capacitor in series with low side of signal generator and B-. Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.01mfd	High side to antenna stator lug of tuning gang. Low side to B-.	455KC (400~ Mod)	Tuning gang fully open	Across voice coil	A1, A2	Adjust for maximum output.
2.	"	"	1650KC	"	"	A3	"
3.	"	"	1400KC	Tune to 1400KC signal	"	A4	Adjust for maximum output. Repeat steps 2 and 3.

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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H806

SET 438 FOLDER 15

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Converter	12AU6	
V2	Det. -AF Amp.	12AV6	

ITEM No.	USE	TYPE	NOTES
V3	Output	50C5	
V4	Rectifier	35W4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	SYMPHONIC PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	40	150	CE-100	PRS150V40 3020	BBRT43215		TDLT-3	FMT-312	R2705 *
B	30	150							
C	20	150							

* Not normally in distributors stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	SYMPHONIC PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	100		CC-102	BPD-0001	DD-101	L10T1	CNO-310	5GA-T1	①
C3	10000		CC-100	BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C4	.05	400	CP-200	P488N-05	DF-503	CUB4S5	GEM-415	4TM-S5	
C5	.05	400	CP-200	P488N-05	DF-503	CUB4S5	GEM-415	4TM-S5	

① Some versions may use 47mmf in this application.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESIST-ANCE	WATTS	SYMPHONIC PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	500K	½	VC-139	B-60	A47-500K-Z	Q13-133	U48	Volume
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
C	Switch			KB-1 or KR-1*	SWE-12	76-1	US-26	

* Use KR with CRL "red label" controls and KB with "blue label" controls.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		SYMPHONIC PART No.	NOTES
	OHMS	WATT		
R2	2.2meg		RC-123	
R3	270K 5%		RC-112	
R4	33K		RC-100	

ITEM No.	RATING		SYMPHONIC PART No.	NOTES
	OHMS	WATT		
R5	150Ω		RC-115	
R6	1000Ω		RC-114	
R7	22Ω	1		

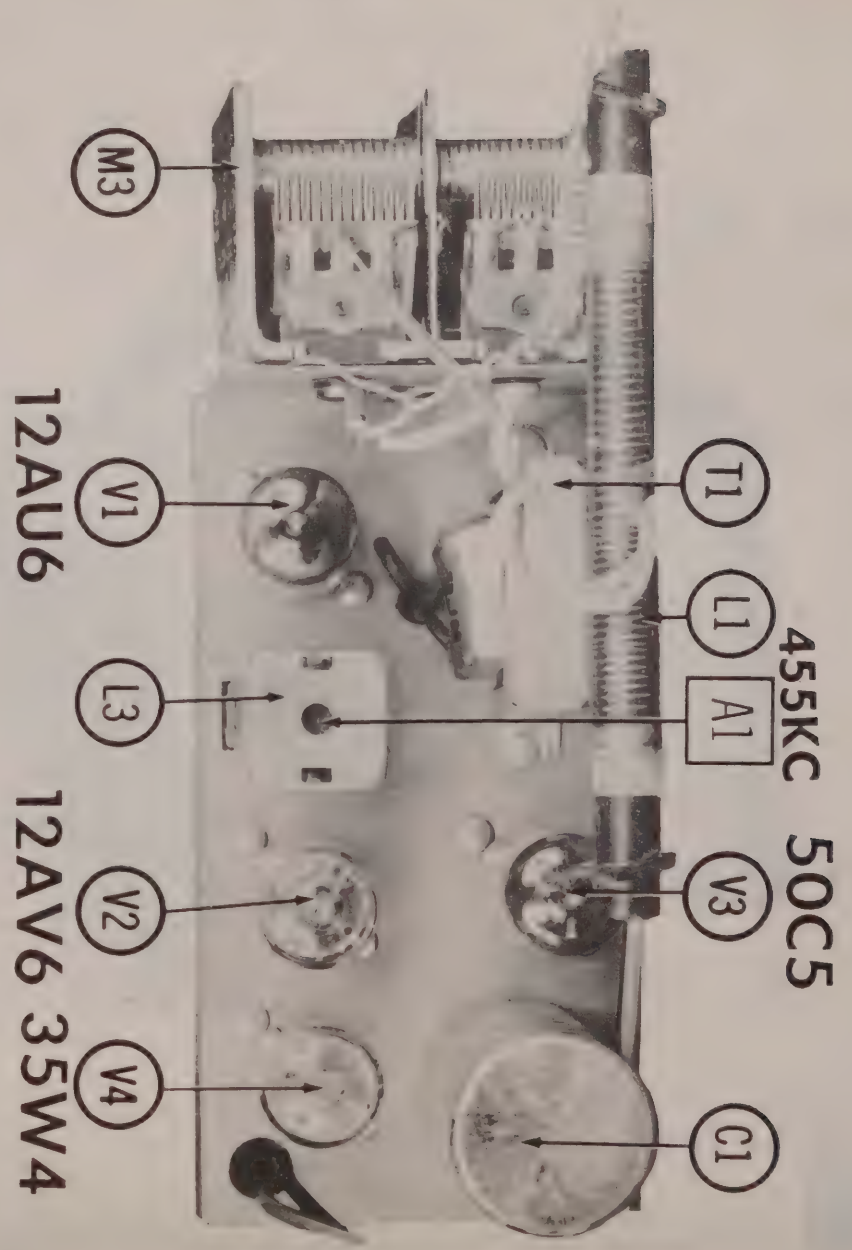
COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					NOTES
		SYMPHONIC PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	Loopstick	AL-100					
L2	Osc. Coil	LO-100					
L3	IF Trans.	LF-102 ①	16-6764				① Alternate Part #IF-102

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	SYMPHONIC PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2350Ω	3-4Ω	TR-109	Z1101	A-3025	AU-605	A-3332	24853	S-12X	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	SYMPHONIC PART No.	QUAM PART No.	
SP1	4"	PM	3-4Ω	SP-407	4A07	

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	SYMPHONIC PART No.	REPLACEMENT DATA	
K1	Audio Circuit	220mmf, 250mmf, 250mmf, 2000mmf, 5000mmf, 470K, 470K, 6.8meg	PC-150	Aerovox Centralab Cornell-Dubilier Sprague	PA-113-1 PC-150 116TM1 DT-1

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA					REMARKS
	SYMPHONIC PART No.	ASTATIC PART No.		JENSEN PART No.		
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	
M1		312-2 * BR-310-2	N8-2			* Tone Arm Complete with Cartridge

ASTATIC NEEDLE LISTING SHOWN ABOVE IS SPECIFIED FOR THE RESPECTIVE REPLACEME NT CARTRIDGE LISTED. FOR ORIGINAL CARTRIDGE NEEDLE REPLACEMENTS SEE BELOW.

PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA			REMARKS
	SYMPHONIC PART No.	JENSEN PART No.	WALCO PART No.	
M2		†CRA-552 or ♦ CRA-552D	† W-64AGS or ♦W-64AGD	† Jewel ♦ Diamond

MISCELLANEOUS

ITEM No.	PART NAME	SYMPHONIC PART No.	NOTES
M3	Tuning Cap.	CV-101	2 Gang (Ant. 21-484mmf, Osc. 8-160mmf)
M4	Switch	SW-109	Radio-Phono (2 Position, Rotary, Wafer Type)
M5	Motor	MO-107	3 Speed, 117VAC

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	KN-120	Tuning
Knob	KN-129	Off-On-Volume
Knob	KN-125	Radio-Phono

WIRING DATA

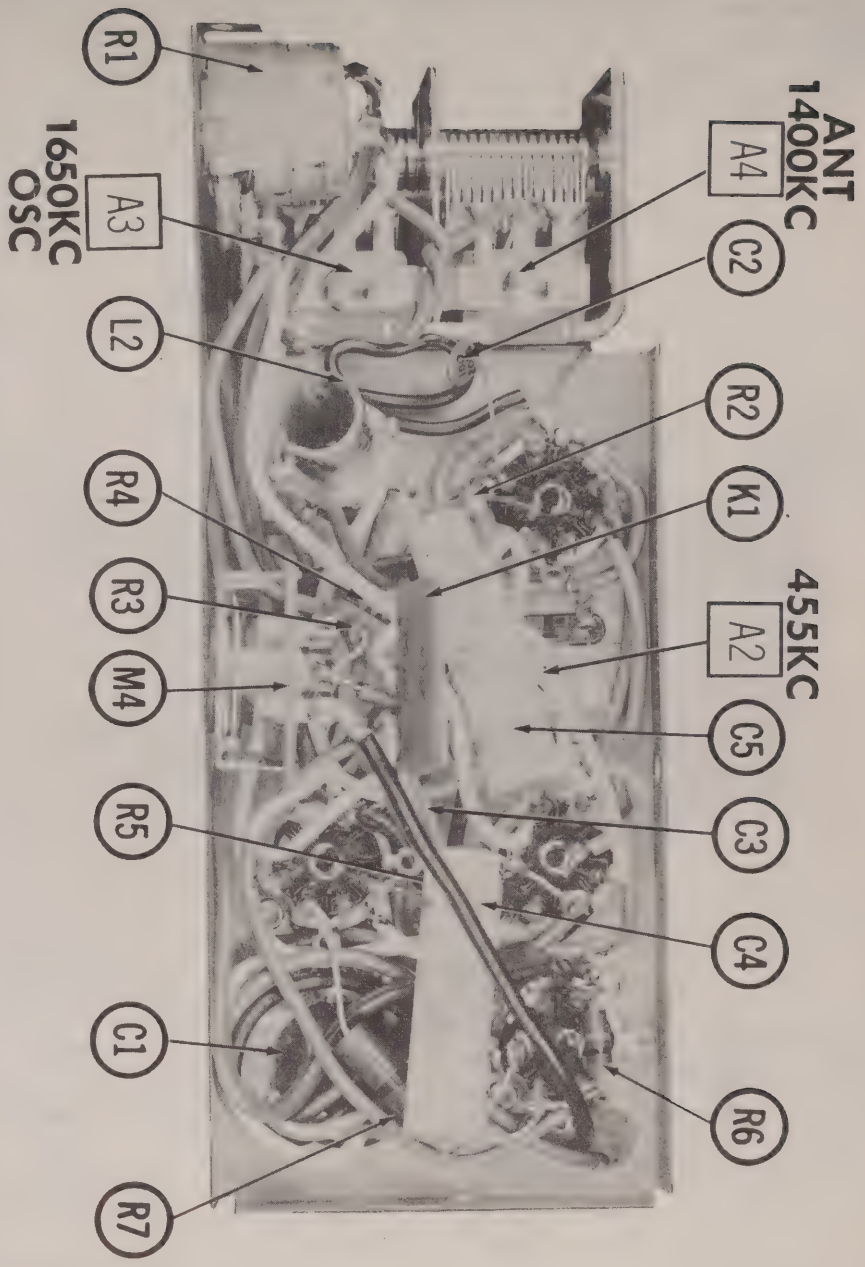
General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

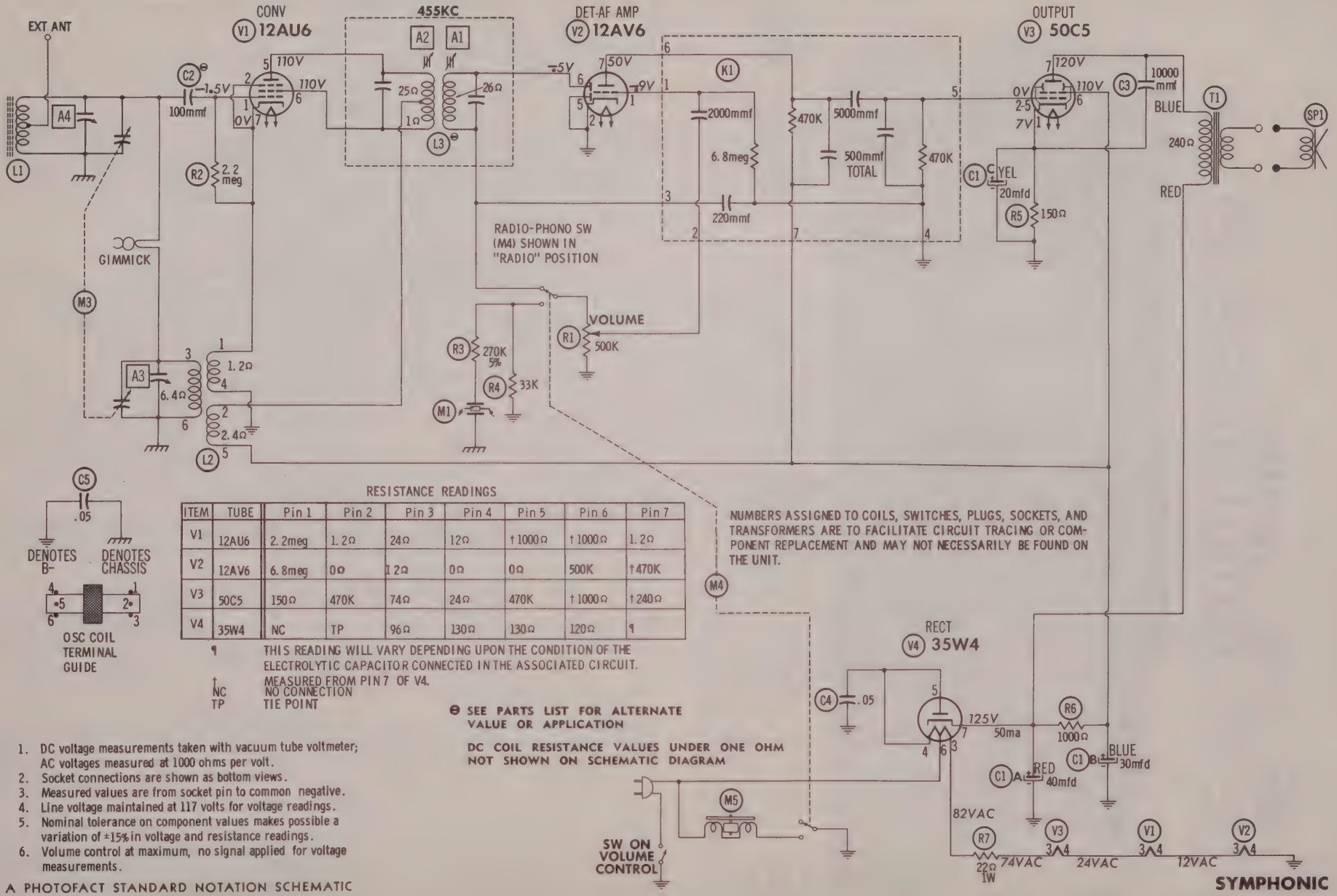
Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

Low-Loss Shielded Lead (Interconnecting) .....Use BELDEN No. 8401

Phono Pick-up Arm Cable ..... Use BELDEN No. 8430 (Two Conductor - Twisted)

CHASSIS—BOTTOM VIEW





ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	12AU6	2.2meg	1.2Ω	24Ω	12Ω	†1000Ω	†1000Ω	1.2Ω
V2	12AV6	6.8meg	0Ω	1.2Ω	0Ω	0Ω	500K	†470K
V3	50C5	150Ω	470K	74Ω	24Ω	470K	†1000Ω	†240Ω
V4	35W4	NC	TP	96Ω	130Ω	130Ω	120Ω	¶

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC CAPACITOR CONNECTED IN THE ASSOCIATED CIRCUIT.

† MEASURED FROM PIN 7 OF V4.

NC NO CONNECTION

TP TIE POINT

Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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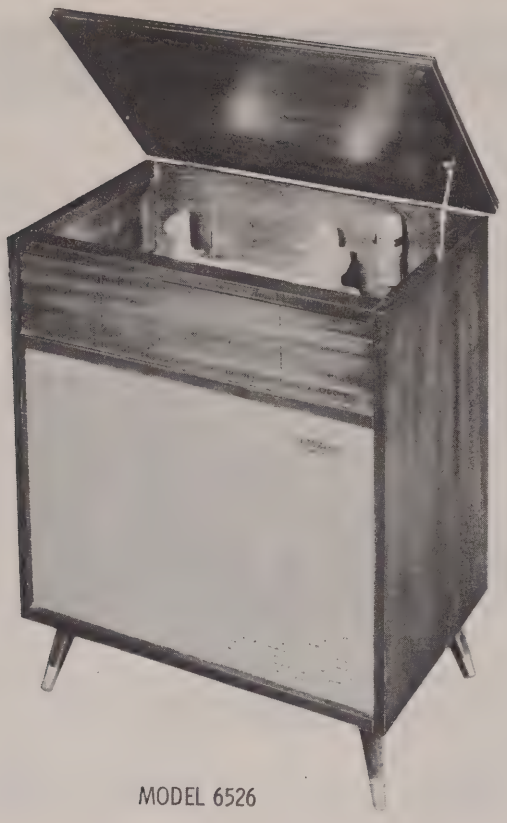
PHOTOFACT* Folder

TRAV-LER MODELS 6520, 6521, 6524, 6525, 6526

TRAV-LER MODELS 6520, 6521, 6524, 6525, 6526



MODEL 6526

TRAV-LER MODELS 6520, 6521, 6524, 6525, 6526

TRADE NAME	Trav-Ler Models 6520, 6521, 6524, 6525, 6526
MANUFACTURER	Trav-Ler Radio & Tel. Corp., 571 W. Jackson Blvd., Chicago, Illinois
TYPE SET	AC Operated AM Receiver With 4 Speed Automatic Record Changer
TUBES (Five)	Types 12BE6 Converter, 12BA6 IF Amplifier, 12AV6 Det.-AVC-AF Amp., 50C5 Output, 35W4 Rectifier
POWER SUPPLY	110 -125 Volts AC - 60 Cycles RATING .25 Amp. @117 Volts AC (24 Watts Less Motor)
TUNING RANGE—BROADCAST	540 - 1610KC

FOR SERVICE INFORMATION ON RECORD CHANGER - SEE SIMILAR MONARCH UA8 - PHOTOFACT SET 381 FOLDER 11.

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer, if available. If not, connect a .1mfd capacitor in series with low side of signal generator and B-. Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1mfd	High side to antenna stator lug of tuning gang. Low side to B-	455KC (400~ Mod.)	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001mfd to reduce hum modulation.
2.	"	"	1610KC	"	"	A5	"
3.	"	"	600KC	600KC	"	A6	If isolation transformer is not used, reduce dummy antenna to .001mfd to reduce hum modulation. Adjust for maximum output while rocking tuning gang. Repeat steps 2 & 3.
4.		Loop	1400KC	Tune to 1400KC signal	"	A7	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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H722

SET 438 FOLDER 16

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Converter	12BE6	
V2	IF Amplifier	12BA6	
V3	Det. -AVC-AF Amp.	12AV6	
V4	Output	50C5	
V5	Rectifier	35W4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	Trav-Ler PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	70	150	EC-68	PRS150V8040	BBRD8415	TCD498	TDLD-11	TVA-2462	
B	40	150							
C2	10	70	EC-11	PRS150V10	BBR10-90	TC42	TD-10-150	TVA-1406	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING			REPLACEMENT DATA						NOTES
	CAP.	VOLT	TOL	Trav-Ler PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C3	220		10%	CC-44		D6-221	L10T22		MS-322	
C4	68		10%		1469-000068	DD-680	22R5Q68		MS-468	①
C5	.047	400		PC-2	P488N-047	DF-503	CUB4S47	GEM-4168	4TM-S47	
C6	.05	400		PC-5	P488N-05	DF-503	CUB4S5	GEM-415	4TM-S5	
C7	1000		10%	CC-37			1R5D1	MCB255	MS-21	
C8	100		N750 10%	CC-5	N750-DI 100	DTN-100	C10T1C	NT-531	5TCU-T1	
C9	.01	200		PC-1	P288N-01	D6-103	CUB2S1	GEM-411	2TM-S1	
C10	4700		10%	CC-35			1R5D47		MS-247	
C11	100			CC-5	SI 100	D6-101	LT6T1	UC-531	5GA-T1	
C12	1000			CC-37			1R5D1	MCB255	MS-21	
C13	.05	400		PC-2	P488N-05	DF-503	CUB4S5	GEM-415	4TM-S5	
C14	3000		5%		1464-003		1R5D3	MCE461	MS-23	②
C15	.01	400		PC-7	P488N-01	D6-106	CUB4S1	GEM-411	4TM-S1	
C16	2.0	50		PC-19						
C17	.05	400		PC-21	P488N-05	DF-503	CUB4S5	GEM-415	4TM-S5	
C18	.1	400		PC-8	P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	

① Some versions may use 47mmf in this application (Part #CC-12).
② Some versions may use 3300mmf in this application (Part #CC-36).

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	Trav-Ler PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	1meg	½	VC-2	B-70	A47-1meg-Z	Q13-137	U53	Volume
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
R2A	1meg	½	VC-67	B-70	A47-1meg-Z	Q13-137	U53	Tone
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
C	Switch			KB-1 or KR-1*	SWE-12	76-1	US-26	

* Use KR with CRL "Red Label" controls and KB with "Blue Label" controls.

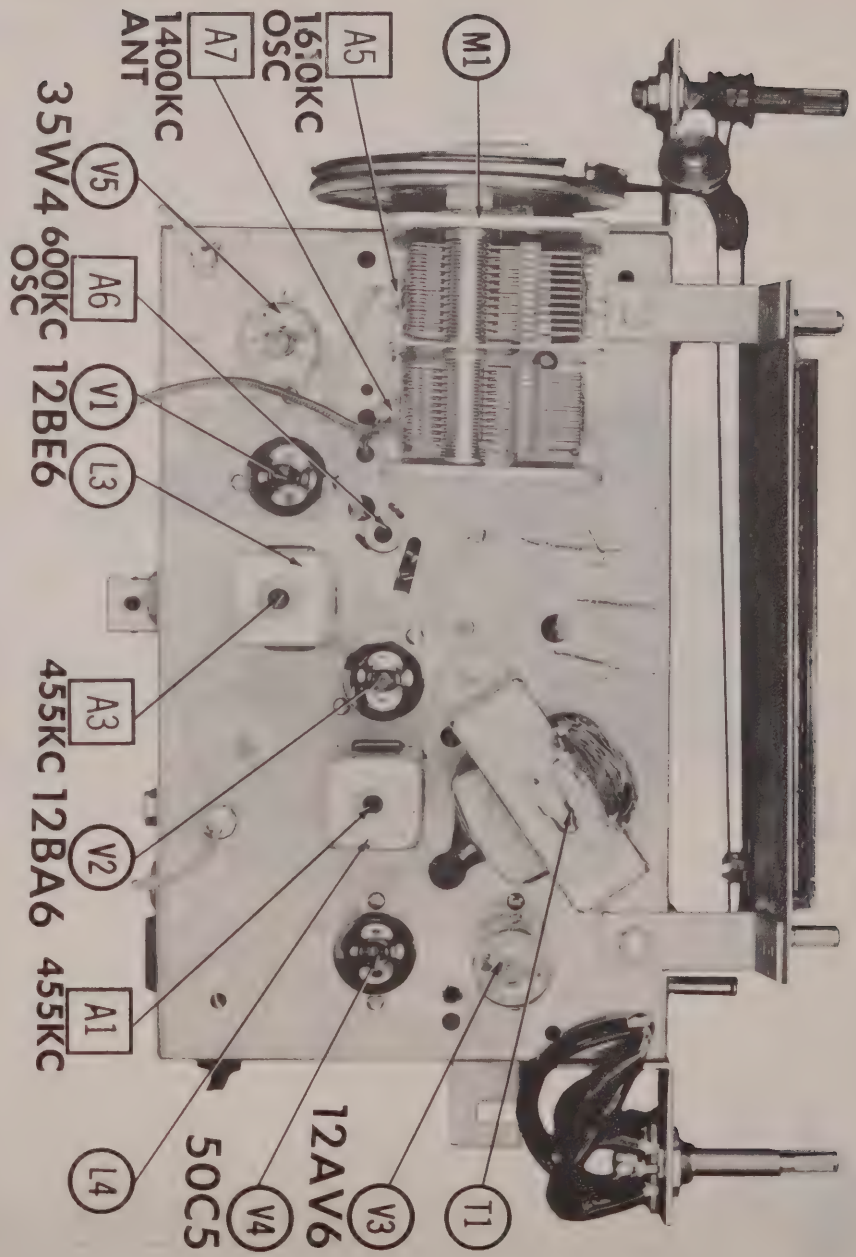
RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		Trav-Ler PART No.	NOTES
	OHMS	WATT		
R3	1meg		IR-12	
R4	47Ω		IR-4	
R5	22K		IR-45	
R6	120Ω		IR-155	
R7	3.3meg		IR-23	
R8	330K			
R9	330K			①
R10	2.7meg			②
R11	1meg		IR-12	
R12	100K			
R13	100K			③
R14	56K		IR-100	
R15	470K		IR-111	
R16	220Ω		IR-5	
R17	1000Ω	1	IR-42	
R18	100K			
R19	100K			③

① Not used when R8 is 680K (Part #IR-127)
② Some versions use 2.2meg in this application (Part #IR-13).
③ Not used when R12 is 220K (Part #IR-20).

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					NOTES
		Trav-Ler PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	Loop Stick	LL-51					
L2	Osc. Coil	LO-27	14-1077	BC-393*	69-08C*		
L3	Input IF	LI-19	16-6758	BC-352	12-C1	RF-1	
L4	Output IF	LI-19	16-6758	BC-353	12-C2	RF-2	

* Disregard capacity winding.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	Trav-Ler PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	3500Ω Tap @ 200Ω (6%)	1-2Ω	AT-27							

SPEAKER

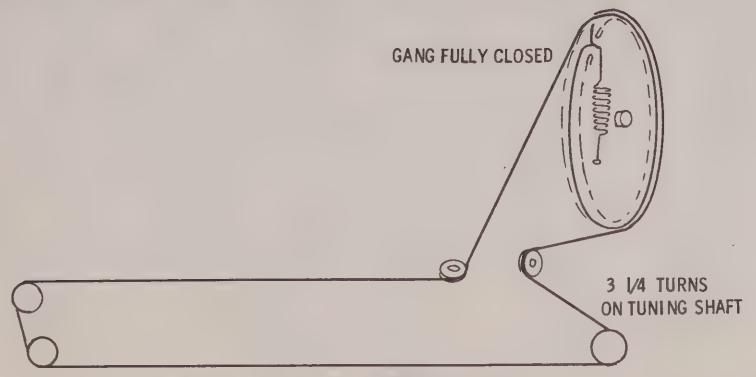
ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	Trav-Ler PART No.	QUAM PART No.	
SP1	6"	PM	3-4Ω	SPK-27①	6A1	① Parallel And Phase
SP2	6"	PM	3-4Ω	SPK-27①	6A1	
SP3	3"	PM	3-4Ω	SPK-28	3A07	

MISCELLANEOUS

ITEM No.	PART NAME	Trav-Ler PART No.	NOTES
M1	Tuning Cap.	GC-24	2 Gang, Ant. 18-384mmf, Osc. 18-166mmf
M2	Switch	SW-1	Radio-Phono, Rotary, Wafer Type

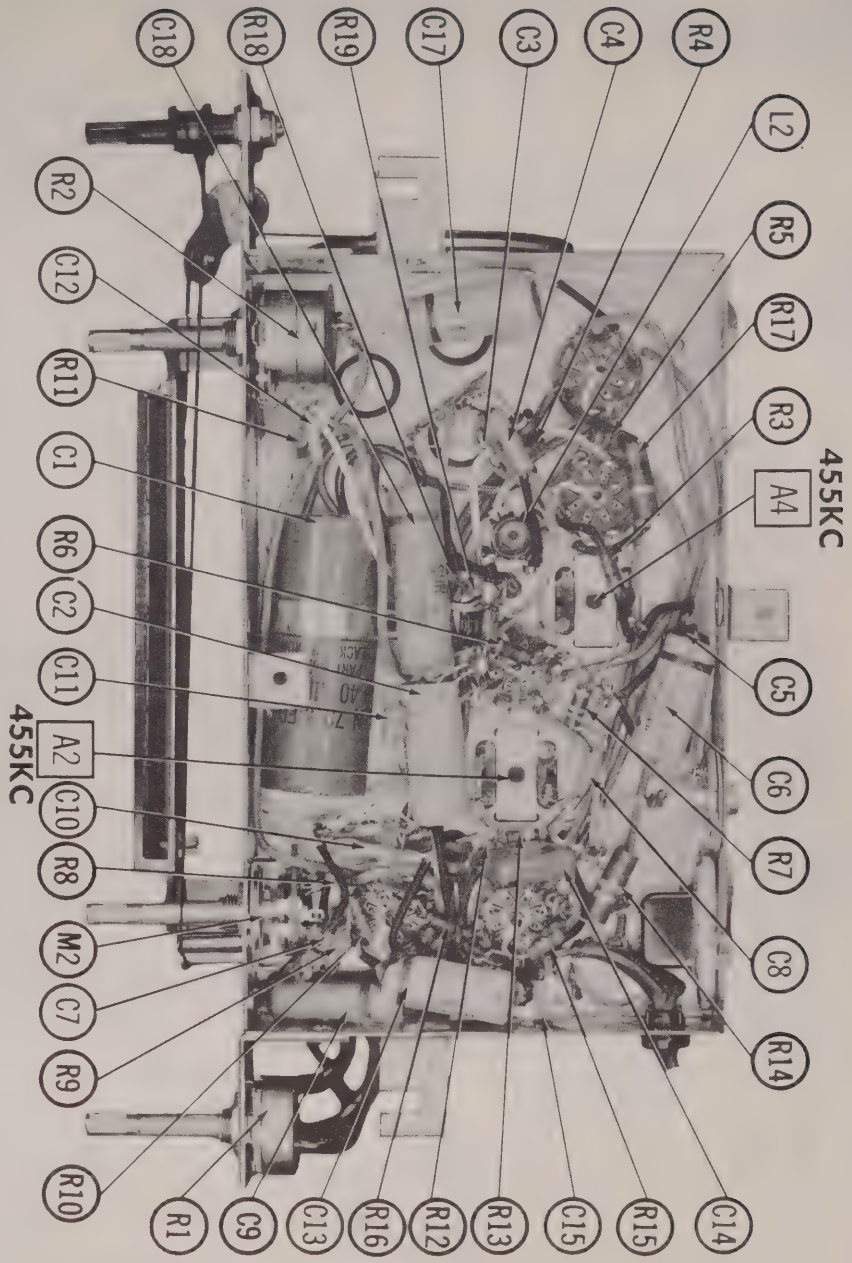
WIRING DATA

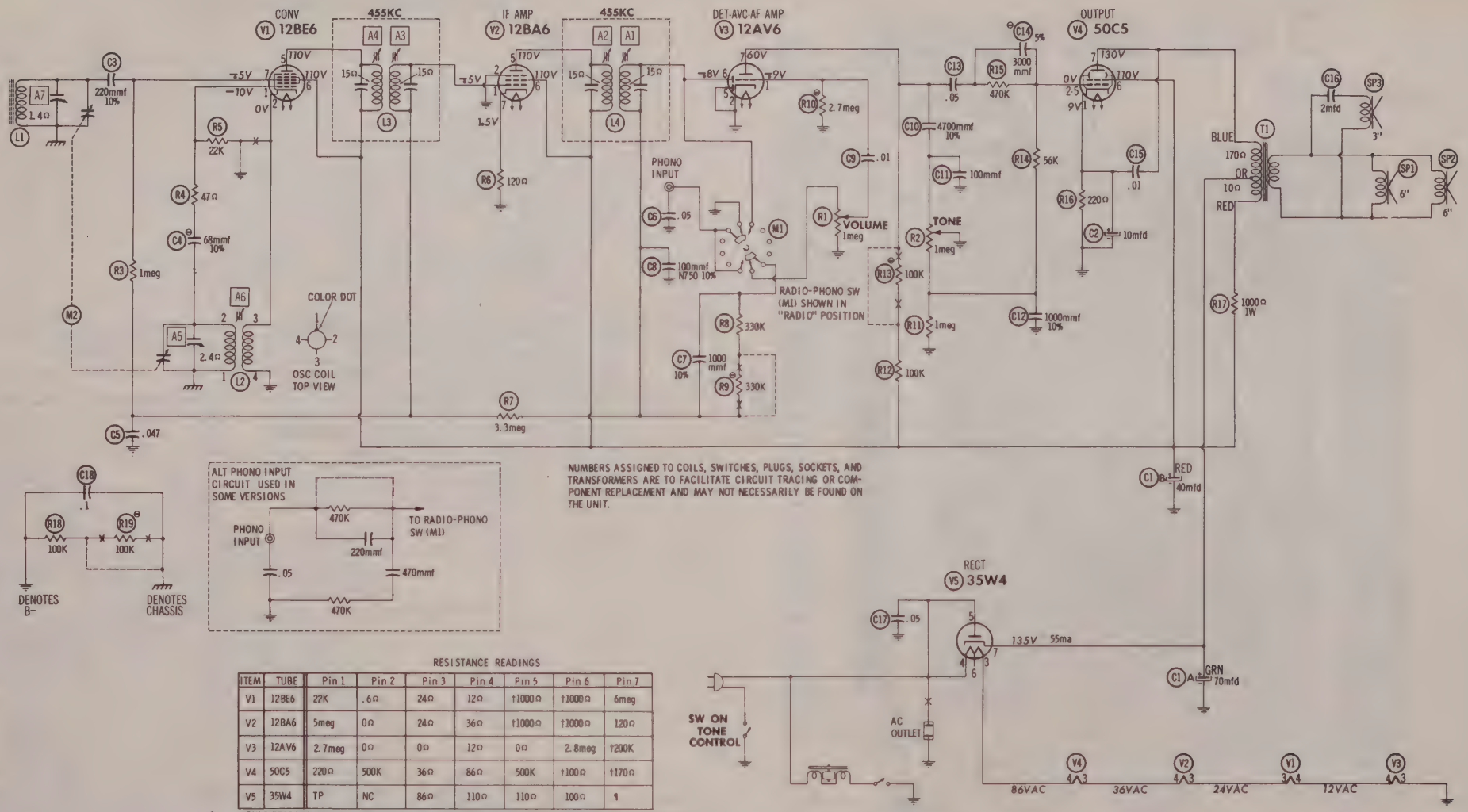
General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord	Use BELDEN No. 1765-B (6 Ft. Length) 1725-K (7½ Ft. Length)
Low-Loss Shielded Lead (Interconnecting)	Use BELDEN No. 8401
Phono Pick-up Arm Cable	Use BELDEN No. 8430 (Two Conductor - Twisted)



DIAL CORD STRINGING

CHASSIS—BOTTOM VIEW





NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	12BE6	22K	.6Ω	24Ω	12Ω	†1000Ω	†1000Ω	6meg
V2	12BA6	5meg	0Ω	24Ω	36Ω	†1000Ω	†1000Ω	120Ω
V3	12AV6	2.7meg	0Ω	0Ω	12Ω	0Ω	2.8meg	†200K
V4	50C5	220Ω	500K	36Ω	86Ω	500K	†100Ω	†170Ω
V5	35W4	TP	NC	86Ω	110Ω	110Ω	100Ω	¶

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
† MEASURED FROM PIN 7 OF V5.
NC NO CONNECTION
TP TIE POINT

Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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TRAV-LER MODELS 6520, 6521, 6524, 6525, 6526

PHOTOFACT* Folder with CIRCUITRACE*

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

ZENITH MODEL
Royal 750L (Ch. 8AT41Z2)

ZENITH MODEL
Royal 750L (Ch. 8AT41Z2)

ZENITH MODEL
Royal 750L (Ch. 8AT41Z2)

TRADE NAME	Zenith Model Royal 750L (CH. 8AT41Z2)
MANUFACTURER	Zenith Radio Corp., 6001 Dickens Ave., Chicago 39, Illinois
TYPE SET	Battery Operated Portable Transistorized AM Receiver
POWER SUPPLY	9 Volts DC
RATING	7.2MA@9 Volts DC (No Signal, Min Volume) 13MA@9 Volts DC (Signal, Normal Volume)
TUNING RANGE—BROADCAST	540-1600KC

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

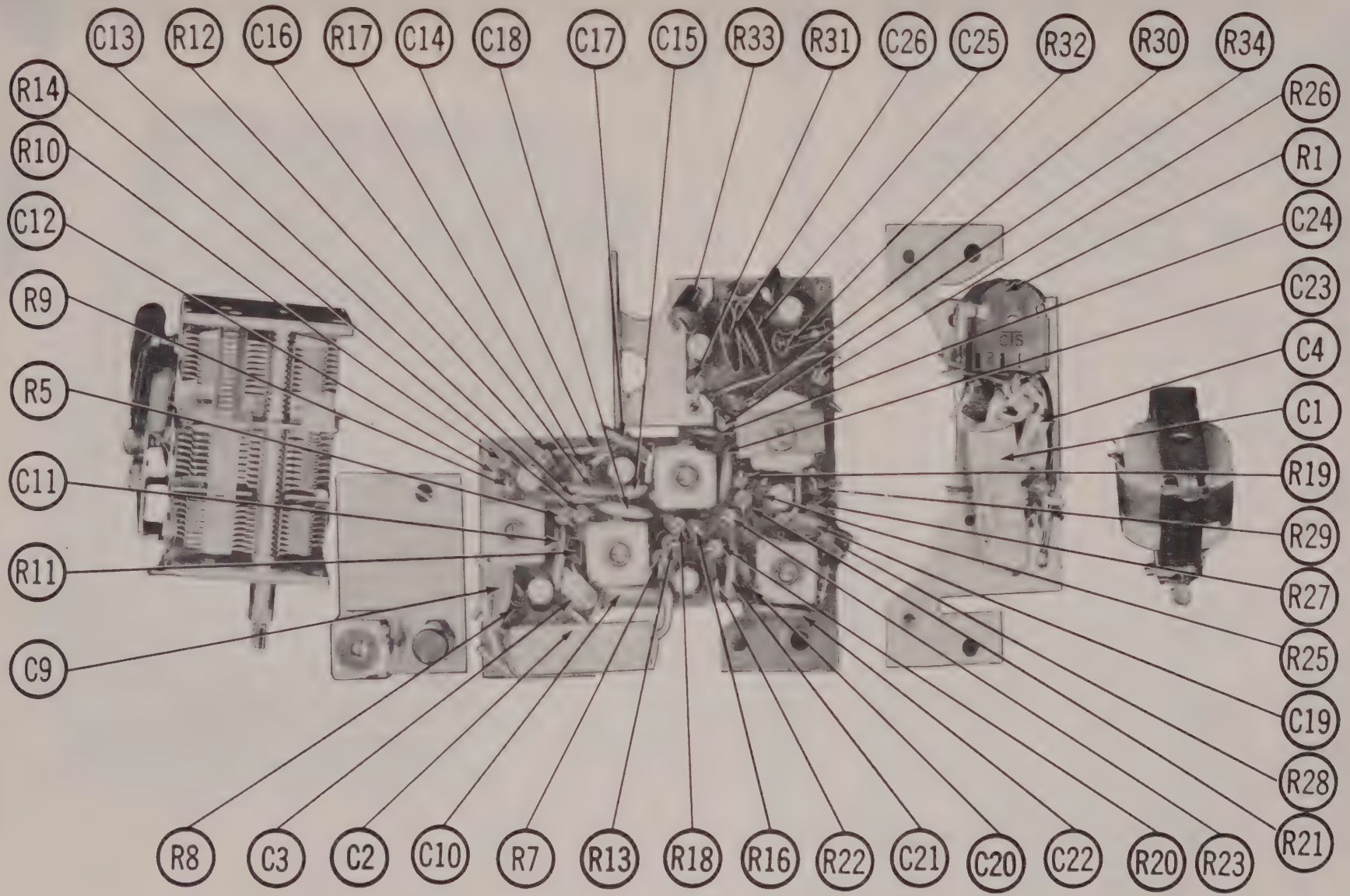
	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.		Loop	455KC (400% Mod.)	Tuning Gang Fully Open	Across Voice Coil	A1, A2, A3	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
2.		"	1620KC	"	"	A4	"
3.		"	535KC	Tuning Gang Fully Closed	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output while rocking tuning gang. Repeat Steps 2 & 3.
4.		"	1260KC	Tune to 1260KC Signal	"	A6, A7	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
5.		"	600KC	Tune to 600KC Signal	"	A8	"

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1959 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

H766

SET 438 FOLDER 17



CHASSIS-TOP VIEW

PARTS LIST AND DESCRIPTIONS

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA				NOTES
			CBS PART No.	RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
X1	121-63	RF Amplifier		2N544	2N487	2N370	PNP
X2	121-62	Mixer		2N411	2N486	2N141	PNP
X3	121-65	Oscillator		2N409	2N483	2N409	PNP
X4	121-73	1st IF Amplifier		2N409	2N483	2N409	PNP
X5	121-74	2nd IF Amplifier		2N409	2N483	2N409	PNP
X6	121-64	Driver		2N407	2N362	2N407	PNP
X7	121-61	Output		2N407	2N632	2N407	PNP
X8	121-61	Output		2N407	2N632	2N407	PNP

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	ZENITH PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1	100	10	22-3023	PWE10100	NL100-10	TT15X100	ML100-15		TE-1162
C2	100	10	22-3023	PWE10100	NL100-10	TT15X100	ML100-15		TE-1162
C3	3	12	22-2884	XPP-12003	NL3-10	TT12X2	ML4-15		TE-1122
C4	3	12	22-2884	XPP-12003	NL3-10	TT12X2	ML4-15		TE-1122
C5	50	12	22-2883	SRE12V50	NL50-10	TT15X50	ML50-15	MQ-0150	TE-1160

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

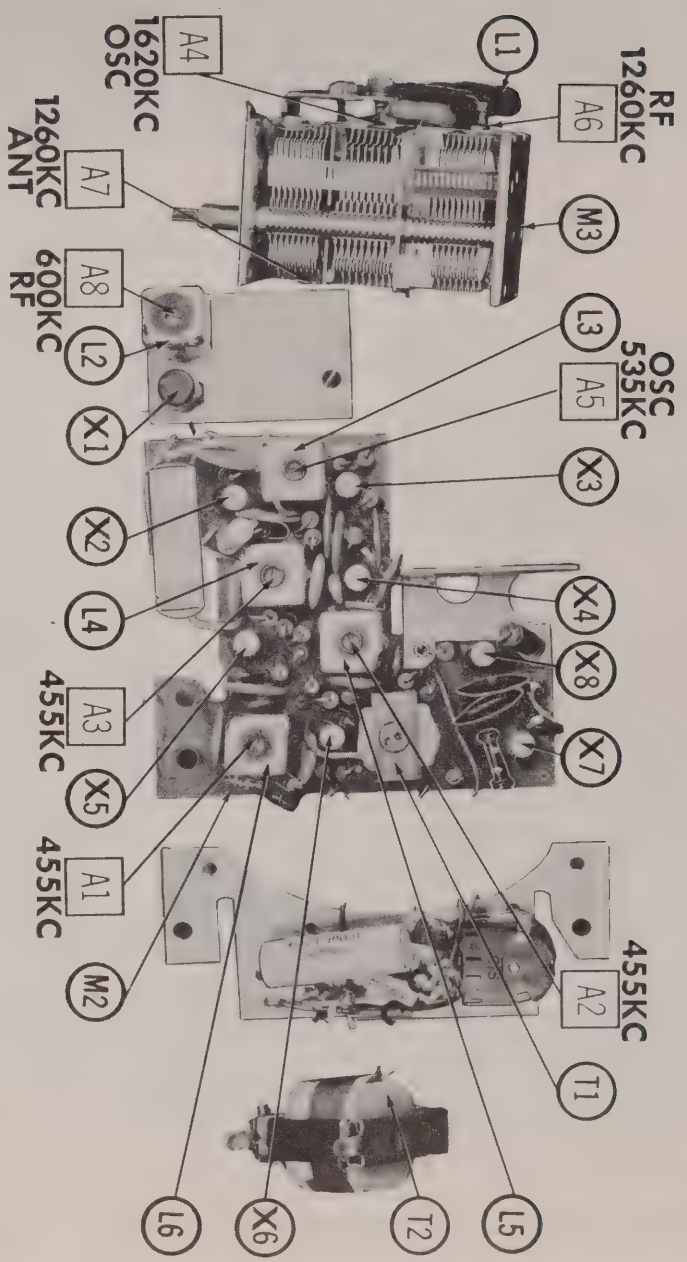
ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	ZENITH PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C6	50000		22-2728	BPD-05	DF-503			5HK-S5	
C7	50000		22-2728	BPD-05	DF-503			5HK-S5	
C8	50000		22-2728	BPD-05	DF-503			5HK-S5	
C9	50000		22-2728	BPD-05	DF-503			5HK-S5	
C10	20000		22-2885	BPD-02	DD-203	BYB6S2		5HK-S2	
C11	50000		22-2728	BPD-05	DF-503			5HK-S5	
C12	1000		22-2729	BPD-001	DD-102	BYA6D1	DC521	5HK-D1	
C13	50000		22-2728	BPD-05	DF-503			5HK-S5	
C14	50000		22-2728	BPD-05	DF-503			5HK-S5	
C15	10		22-2731	N750-D110	DTN-10				N750 5%
C16	50000		22-2728	BPD-05	DF-503			5HK-S5	
C17	50000		22-2728	BPD-05	DF-503			5HK-S5	
C18	20000		22-2885	BPD-02	DD-203	BYB6S2		5HK-S2	
C19	20000		22-2885	BPD-02	DD-203	BYB6S2		5HK-S2	
C20	6		22-2381		DD-060				
C21	50000		22-2728	BPD-05	DF-503			5HK-S5	
C22	50000		22-2728	BPD-05	DF-503			5HK-S5	
C23	20000		22-2885	BPD-02	DD-203	BYB6S2		5HK-S2	
C24	10000		22-3010	BPD-01	DD-103	BYA10S1	DC521	5HK-S1	
C25	1000	1000	22-17	HVD-15-1000	DD-102	BYA10D1M	DC3021	5HK-D1	
C26	1000	1000	22-17	HVD-15-1000	DD-102	BYA10D1M	DC3021	5HK-D1	

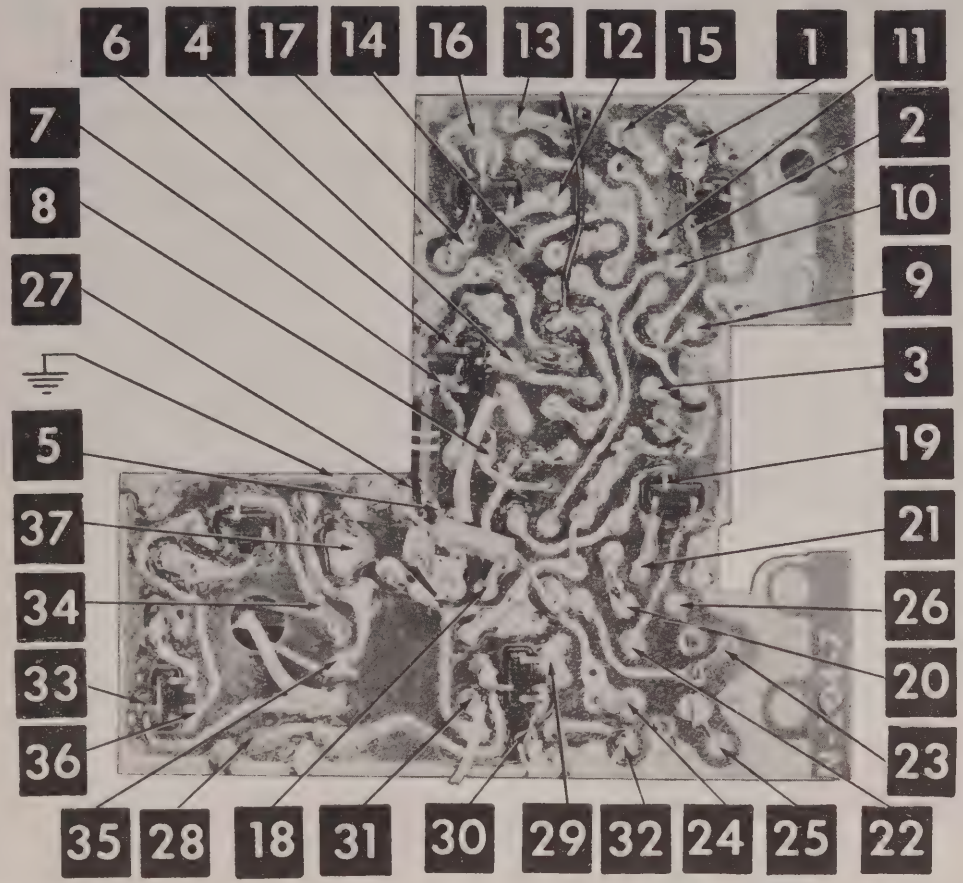
CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	ZENITH PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A B	50000Ω Switch	½	63-4035①					Volume

① Part #63-4094 may be used in some versions.

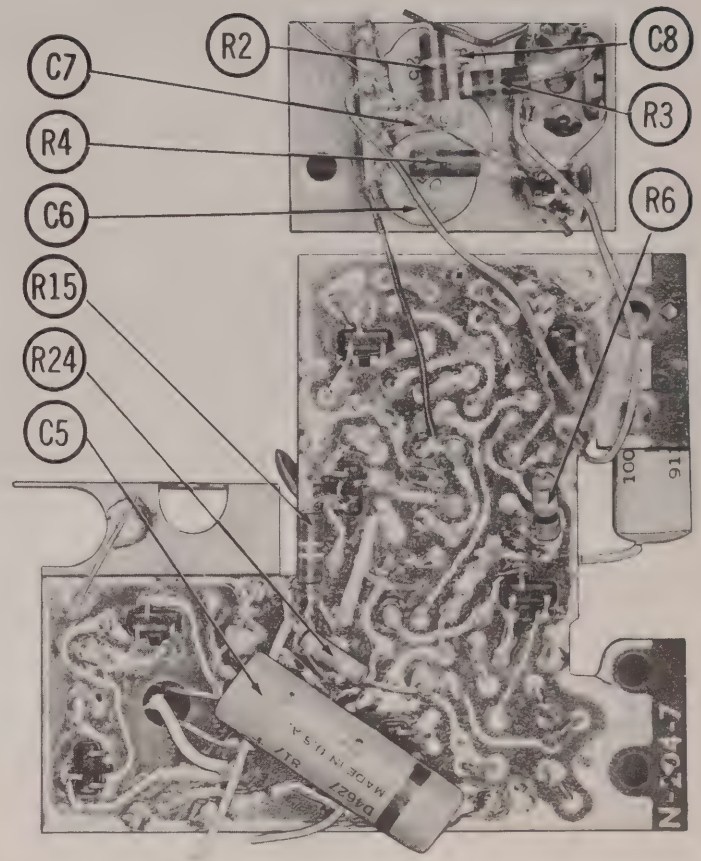
CHASSIS—TOP VIEW





A Howard W. Sams CIRCUITRACE® Photo

PRINTED BOARD



PRINTED BOARD - BOTTOM VIEW

PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	ZENITH PART No.	NOTES
R2	1000Ω		63-1786	
R3	2200Ω		63-1799	
R4	560Ω		63-1775	
R5	1000Ω		63-1786	
R6	100K		63-1869	
R7	560Ω		63-1775	
R8	3900Ω		63-1810	
R9	22K		63-1841	
R10	4700Ω		63-1813	
R11	560Ω		63-1775	
R12	1000Ω		63-1786	
R13	180K		63-1880	
R14	6800Ω		63-1820	
R15	220K		63-1883	
R16	1000Ω		63-1786	
R17	820Ω		63-1782	
R18	33K		63-1848	
R19	3900Ω		63-1810	
R20	5600Ω		63-1817	
R21	560Ω		63-1775	
R22	820Ω		63-1782	
R23	10K		63-1827	
R24	470Ω		63-1771	
R25	68K		63-1862	
R26	5600Ω		63-1817	
R27	22Ω		63-1715	
R28	680Ω		63-1778	
R29	3300Ω		63-1806	
R30	5600Ω		63-1817	
R31	820Ω		63-1782	
R32	Thermistor		63-3663	
R33	4.7Ω	1	63-3665	
R34	100Ω		63-1744	

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA: ZENITH PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	NOTES
L1	Loopstick	S-43160					
L2	RF Coil	95-1596					
L3	Osc. Coil	95-1597					
L4	1st IF	95-1594					
L5	2nd IF	95-1595					
L6	3rd IF	95-1586					

TRANSFORMER (DRIVER)

ITEM No.	TURNS RATIO PRI.	TURNS RATIO SEC.	REPLACEMENT DATA: ZENITH PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T1	1.5	: 1	95-1598	GH118①		TA-36①	TR-6①		① Remove Channel Frame

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA: ZENITH PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T2	450Ω CT	3-4Ω	95-1588							

SPEAKER

ITEM No.	TYPE SIZE	TYPE FIELD	TYPE V. C. IMP.	REPLACEMENT DATA: ZENITH PART No.	QUAM PART No.	NOTES
SP1	4"	PM	3-4Ω	49-839	4A07	

BATTERIES

ITEM No.	VOLTAGE	ZENITH PART No.	REPLACEMENT DATA: BURGESS "A"	BURGESS "B"	EVEREADY "A"	EVEREADY "B"	MALLORY "A"	MALLORY "B"	NOTES
M1	9V	Z-7①		1 ①		935 ①		M-14 ①	① 6 Used

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA: ZENITH PART No.	CBS PART No.	SYLVANIA PART No.	NOTES
M2	1N87G	103-19	1N60	1N295	Detector (Pigtail)

MISCELLANEOUS

ITEM No.	PART NAME	ZENITH PART No.	NOTES
M3	Tuning Cap.	22-3044	3 Gang (Ant. 19-240mmf, RF 10-230mmf)
	Jack	44-34	Earphone
	Printed Board	N-204-7	

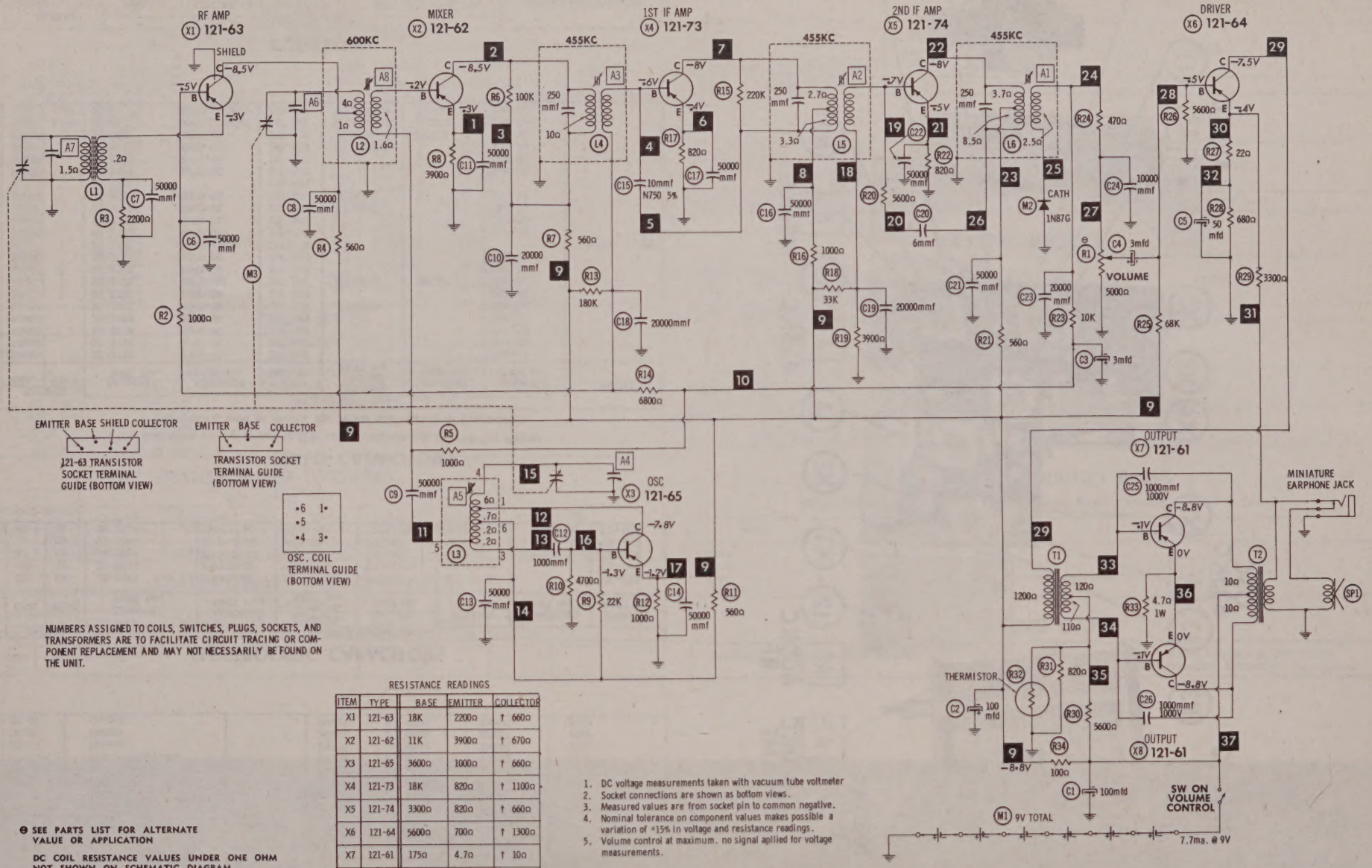
CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	46-1671	Tuning
Knob	46-1673	On-Off-Volume
Knob	S-42733	Dial, Includes Ring Assembly
Cabinet	14-2359	

WIRING DATA

General-use Unshielded Hook-up Wire .....Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors



NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

RESISTANCE READINGS

ITEM	TYPE	BASE	EMITTER	COLLECTOR
X1	121-63	18K	2200Ω	† 660Ω
X2	121-62	11K	3900Ω	† 670Ω
X3	121-65	3600Ω	1000Ω	† 660Ω
X4	121-73	18K	820Ω	† 1100Ω
X5	121-74	3300Ω	820Ω	† 660Ω
X6	121-64	5600Ω	700Ω	† 1300Ω
X7	121-61	175Ω	4.7Ω	† 10Ω
X8	121-61	175Ω	4.7Ω	† 10Ω

TRANSISTORS REMOVED FOR RESISTANCE MEASUREMENTS.
† MEASURED FROM NEGATIVE TERMINAL OF CI.

1. DC voltage measurements taken with vacuum tube voltmeter
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
5. Volume control at maximum. no signal apllied for voltage measurements.

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

A PHOTOFACT STANDARD NOTATION SCHEMATIC with CIRCUITRACE®

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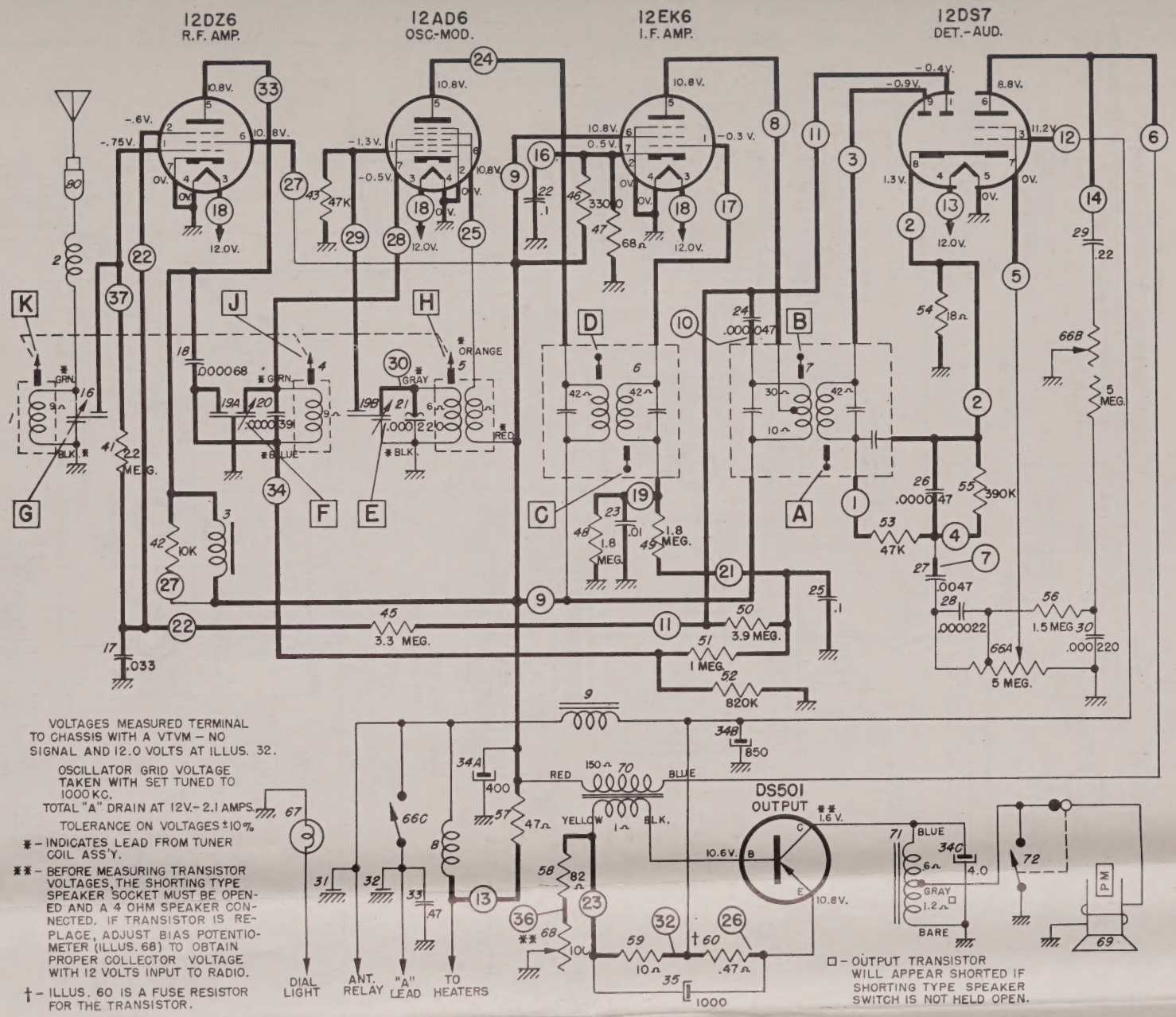
ZENITH MODEL
Royal 750L (Ch. 8AT41Z2)

PONTIAC MODEL 988976

THE SPEAKER SOCKET, MOUNTED ON OUTPUT TRANSFORMER, IS A SHORTING-TYPE AND MUST BE MECHANICALLY OPENED WHEN TESTING RADIO ON BENCH.

Printed circuit shown in heavy lines



VOLTAGES MEASURED TERMINAL TO CHASSIS WITH A VTVM – NO SIGNAL AND 12.0 VOLTS AT ILLUS. 32.

OSCILLATOR GRID VOLTAGE TAKEN WITH SET TUNED TO 1000 KC.

TOTAL "A" DRAIN AT 12V.– 2.1 AMPS.

TOLERANCE ON VOLTAGES ±10%

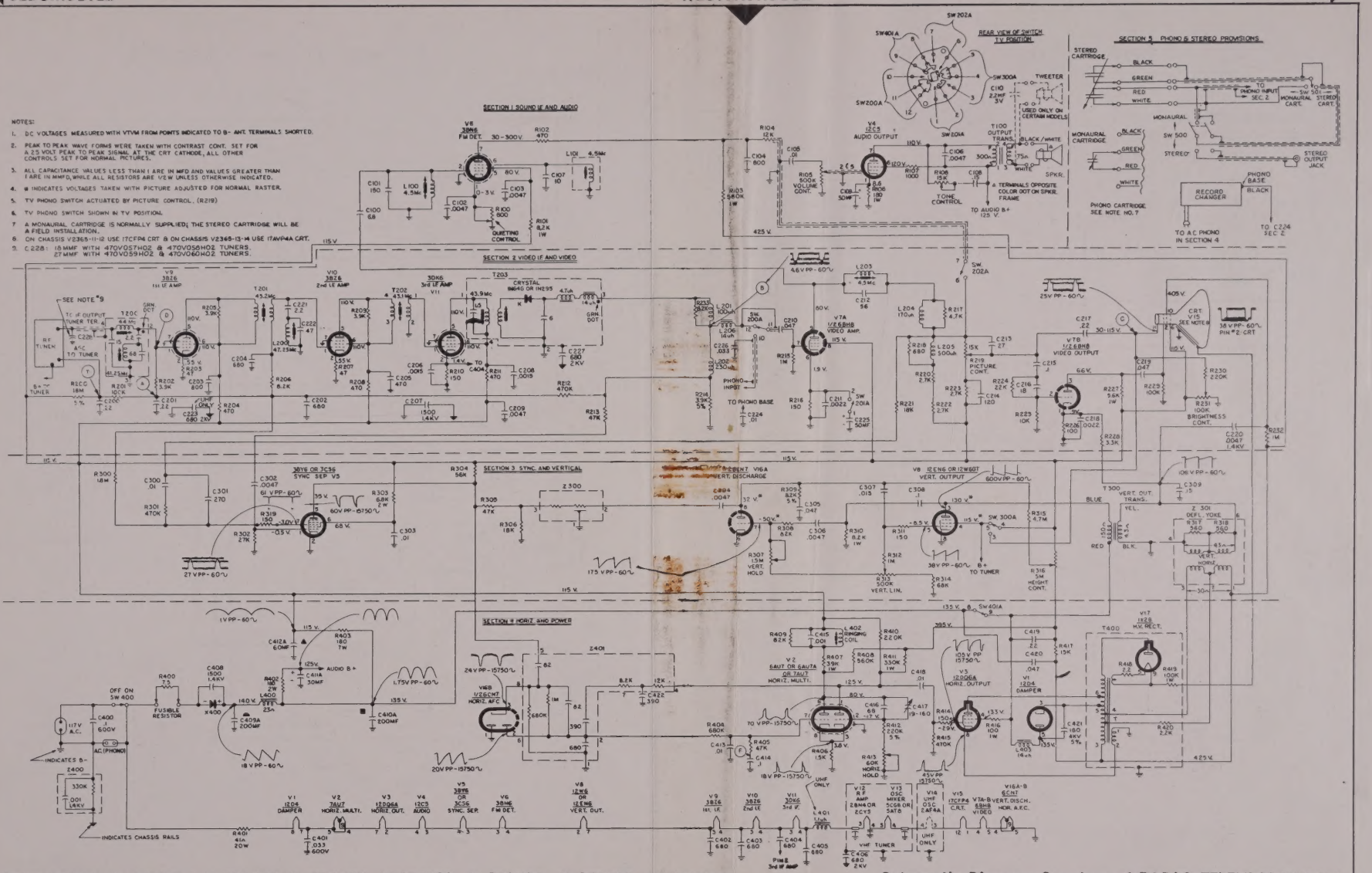
* – INDICATES LEAD FROM TUNER COIL ASS'Y.

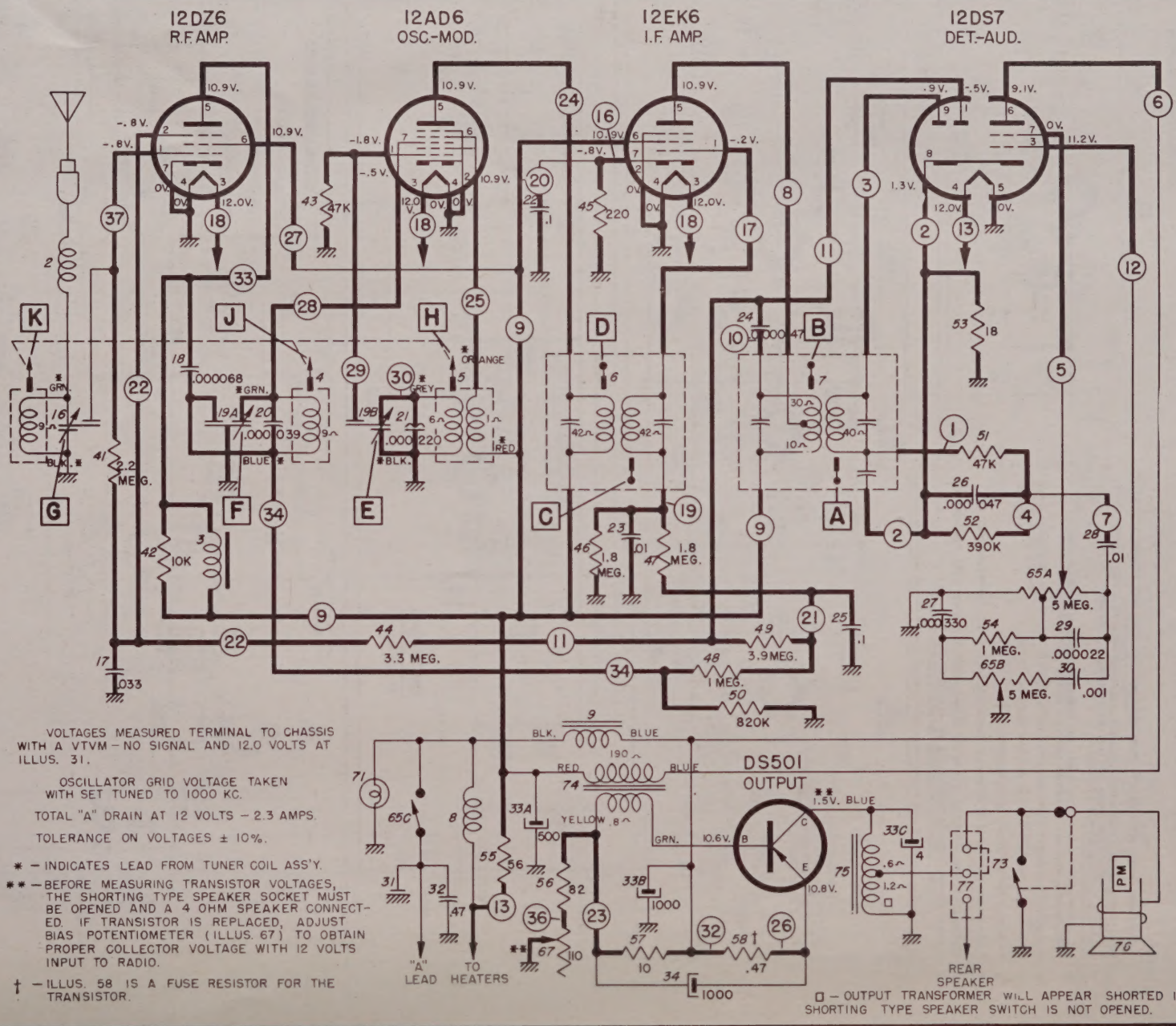
** – BEFORE MEASURING TRANSISTOR VOLTAGES, THE SHORTING TYPE SPEAKER SOCKET MUST BE OPENED AND A 4 OHM SPEAKER CONNECTED. IF TRANSISTOR IS REPLACE, ADJUST BIAS POTENTIOMETER (ILLUS. 68) TO OBTAIN PROPER COLLECTOR VOLTAGE WITH 12 VOLTS INPUT TO RADIO.

† – ILLUS. 60 IS A FUSE RESISTOR FOR THE TRANSISTOR.

□ – OUTPUT TRANSISTOR WILL APPEAR SHORTED IF SHORTING TYPE SPEAKER SWITCH IS NOT HELD OPEN.

Schematic Diagrams Courtesy of DELCO RADIO DIV.. GENERAL MOTORS CORP.


NOTES:
1. DC VOLTAGES MEASURED WITH VTVM FROM POINTS INDICATED TO B- ANT. TERMINALS SHORTED.
2. PEAK TO PEAK WAVE FORMS WERE TAKEN WITH CONTRAST CONT. SET FOR A 2.5 VOLT PEAK TO PEAK SIGNAL AT THE CRT CATHODE, ALL OTHER CONTROLS SET FOR NORMAL PICTURES.
3. ALL CAPACITANCE VALUES LESS THAN 1 ARE IN MFD AND VALUES GREATER THAN 1 ARE IN MMFD, WHILE ALL RESISTORS ARE 1/2W UNLESS OTHERWISE INDICATED.
4. # INDICATES VOLTAGES TAKEN WITH PICTURE ADJUSTED FOR NORMAL RASTER.
5. TV PHONO SWITCH ACTUATED BY PICTURE CONTROL. (R219)
6. TV PHONO SWITCH SHOWN IN TV POSITION.
7. A MONAURIAL CARTRIDGE IS NORMALLY SUPPLIED; THE STEREO CARTRIDGE WILL BE A FIELD INSTALLATION.
8. ON CHASSIS V2365-11-12 USE 17CFP4 CRT & ON CHASSIS V2365-13-14 USE 17AVP4A CRT.
9. C228: 18 MMF WITH 470V05TH02 & 470V05SH02 TUNERS.
27 MMF WITH 470V05SH02 & 470V06DH02 TUNERS.
SECTION 1 SOUND IF AND AUDIO
SECTION 2 VIDEO IF AND VIDEO
SECTION 3 SYNC AND VERTICAL
SECTION 4 HORIZ. AND POWER
SECTION 5 PHONO & STEREO PROVISIONS
REAR VIEW OF SWITCH TV POSITION
SW 202A
SW 401A
SW 300A
SW 200A
SW 201A
SW 202A
SW 401A
SW 500
SW 501
TWEETER
USED ONLY ON CERTAIN MODELS
AUDIO OUTPUT
TONE CONTROL
VOLUME CONT.
SPKR.
TO AUDIO B+ 125 V.
STEREO CARTRIDGE
MONAURAL CARTRIDGE
BLACK
GREEN
RED
WHITE
MONAURAL
STEREO
PHONO CARTRIDGE SEE NOTE NO. 7
RECORD CHANGER
PHONO BASE
TO PHONO INPUT SEC. 2
MONAURAL CART.
STEREO CART.
STEREO OUTPUT JACK
TO A.C. PHONO IN SECTION 4
TO C224 SEC. 2
TO PHONO BASE
PHONO INPUT
V1 1204 DAMPER
V2 7AUT HORIZ. MULTI.
V3 12DQ6A HORIZ. OUT.
V4 12C5 AUDIO
V5 3BY6 OR 3C36 SYNC. SEP.
V6 3BH6 FM DET.
V7 12AV7 VERT. DISCHARGE
V8 12EN6 OR 12EG6 VERT. OUT.
V9 3B26 1st I.F.
V10 3B26 2nd I.F.
V11 3DK6 3rd I.F.
V12 6AU8 R.F. AMP.
V13 6BA6 OSC. MIXER
V14 6U8 VIDEO
V15 17CFP4 C.R.T.
V16 6CN7 VERT. DISCH. HOR. A.F.C.
V17 1B2B H.V. RECT.
V18 12DQ6A HORIZ. OUTPUT
V19 6AU7 OR 6AU7A HORIZ. MULTI.
V20 12EG6CT HORIZ. A.F.C.
V21 3BY6 OR 3C36 SYNC. SEP.
V22 12EN6 OR 12EG6 VERT. OUT.
V23 3B26 FM DET.
V24 3B26 1st I.F.
V25 3B26 2nd I.F.
V26 3DK6 3rd I.F.
V27 6AU8 R.F. AMP.
V28 6BA6 OSC. MIXER
V29 6U8 VIDEO
V30 17CFP4 C.R.T.
V31 6CN7 VERT. DISCH. HOR. A.F.C.
V32 1B2B H.V. RECT.
V33 12DQ6A HORIZ. OUTPUT
V34 1204 DAMPER
T100 OUTPUT TRANS.
T200 T203 CRYSTAL
T300 VERT. OUT. TRANS.
T400
Z300
Z301 DEFL. YOKE
Z401
CRT V15 SEE NOTE 8
38 VPP-60~ PIX 2 CRT
RF TUNER
AFC TO TUNER
B+ TUNER
TO TUNER
TO C404
TO C404
TO C404



VOLTAGES MEASURED TERMINAL TO CHASSIS WITH A VTVM – NO SIGNAL AND 12.0 VOLTS AT ILLUS. 31.

OSCILLATOR GRID VOLTAGE TAKEN WITH SET TUNED TO 1000 KC.

TOTAL "A" DRAIN AT 12 VOLTS – 2.3 AMPS.

TOLERANCE ON VOLTAGES ± 10%.

* – INDICATES LEAD FROM TUNER COIL ASS'Y.

** – BEFORE MEASURING TRANSISTOR VOLTAGES, THE SHORTING TYPE SPEAKER SOCKET MUST BE OPENED AND A 4 OHM SPEAKER CONNECTED. IF TRANSISTOR IS REPLACED, ADJUST BIAS POTENTIOMETER (ILLUS. 67) TO OBTAIN PROPER COLLECTOR VOLTAGE WITH 12 VOLTS INPUT TO RADIO.

† – ILLUS. 58 IS A FUSE RESISTOR FOR THE TRANSISTOR.

□ – OUTPUT TRANSFORMER WILL APPEAR SHORTED IF SHORTING TYPE SPEAKER SWITCH IS NOT OPENED.

ILLUS. 77 IS SOCKET FOR REAR SPEAKER CONTROL AND INCORPORATES A SHORTING SWITCH. WHEN JUMPER OR CONTROL ARE REMOVED THE OUTPUT TRANSFORMER IS SHORTED.

Printed circuit shown in heavy lines

OLDSMOBILE MODEL 989170